

STULZ the natural choice

## Instructions

# CyberAir 3 CW

Precision Air Conditioning Units  
380-415/3/50

Index 18  
Issue 8.2011

Original instructions



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Subject to technical modifications.

# 1. Safety

## 1.1 Marking



Danger - threatening danger, grievous bodily harm and death



Attention - dangerous situation, light bodily injury and material damage



Information - important information and application notice



ESD note - risk of damaging electronical components

## 1.2 Safety instructions

### General

These operating instructions contain basic information which is to be complied with for installation, operation and maintenance. They must therefore be read and complied with by the fitter and the responsible trained staff/operators before assembly and commissioning. They must be permanently available at the place where the system is used.



- Works have to be carried out by competent staff only
- Observance of the regulations for accident prevention
- Stay out of danger when lifting and setting off the unit
- Secure the unit to avoid the risk of overturning
- Safety devices may not be bypassed.
- Respect the corresponding VDE-, EN- and IEC standards for the electrical connection of the unit and observe the conditions of the power supply companies
- Switch off the voltage from the unit when working on it.



- Observe the national regulations of the country where the unit will be installed
- Cooling water additives have an acidic effect on skin and eyes, wear safety glasses and safety gloves
- The unit may only be used to cool air according to the Stulz specification.



- Respect material compatibility in the whole hydraulic circuit.
- The male triangular wrench is to be placed in a visible location in the immediate vicinity of the unit.

### **1.3 Safety and environmental requirements**

The following requirements relate to the operation of refrigerating plants within the European Community.

- The used components must correspond to the pressure equipment guide-line EC/97/23 and EN 378 part 1-4.
- Independent of the design, the equipment and inspection before the delivery, also the operator of such plants has duties according to EN 378 and national regulations.

This concerns the installation, the operation and the repeated inspection:

- Installation: according to EN 378
- Operation:   Determination of emergency measures (accidents, malfunctions)  
                  Creation of an abbreviated instruction and notification (template page)
  - a. A unit protocol must be kept.
  - b. To be stored in the proximity of the unit
  - c. Access for competent staff in case of repairs and repeated inspection must be ensured.
- Repeated inspection:   according to EN 378  
                                  The operator is responsible for the execution.

The operator must ensure that all maintenance, inspection and assembly work is carried out by authorised and qualified specialist staff who have made an in-depth study of the operating instructions.

It is absolutely essential to comply with the procedure for shutting down the system described in the operating instructions. Before maintenance work, the unit must be switched off at the main switch and a warning sign displayed to prevent unintentional switching-on.

#### **Independent conversion and manufacture of replacement parts**

The system may only be converted or modified after consultation with STULZ. Original replacement parts and replacement parts/accessories authorised by STULZ are an aid to safety.

#### **Unacceptable operating methods**

The operating safety of the system is only guaranteed when it is used as intended. The limit values stipulated in the technical data must not be exceeded under any circumstances.

## 2. Residual risks

### Transport, Installation

Area	Cause	Danger	Safety note
Under the unit	Defective lifting device	Bruising	Keep away from under the unit
Beside the unit	Uneven or insufficient foundation or raised floor stand	Bruising by tipping over of the unit	Make sure, the foundation is even and stable and that the raised floor stand is correctly mounted. Wear protective equipment (helmet, gloves, safety shoes).
In the lower part of the unit	Heat by soldering flame, sharp edges, built-in parts	Burns, cuts, concussion damage	Wear safety glasses and gloves, don't put your head into the unit.
Electrical box	Connection cable under voltage, sharp edges of the openings for the cable introduction	Electric shock, cable damage at positioning	Check and make sure the unit is de-energized. Stand on isolated ground. Take care that sharp edges are always protected by rubber grommets

### Start-up

Area	Cause	Danger	Safety note
In the lower part of the unit, water piping	Leaks in the water lines, closed stop valves	Discharge of water under high pressure, contact with the skin of ethylen glycol, irritation of eyes and respiratory system by glycol vapours, increased risk of electric shock in combination with electricity, risk of slipping	Open stop valves. Wear rubber gloves, ethylen glycol is absorbed by the skin. Avoid swallowing water with glycol additives.
Fan outlet of up-flow units	Small parts fallen into the fan	Small parts can be thrown out of the fan when the unit starts.	Keep away from above the fan outlet.
Fan, V-belt drive	Unit operation with open doors.	Risk of injury by rotating parts. Hanging parts of the clothing or long hair can be wound around the rotating shaft.	Keep the distance to fan and V-belt drive. Tie up long hair, wear hair protection.
Electrical box	Short circuit	Electric arc, acid vapours	Retighten terminal connections, Wear protective gloves

**Operation**

Area	Cause	Danger	Safety note
Unit bottom, eventually raised floor	Accumulation of condensate and water discharge by too small or clogged drain pipe	Corrosion and development of mould by moistness. Humidity in combination with electric connections.	De-energize water discharge area.
Electrical alimentation	Falsely dimensioned cables or protection devices	Short-circuit, fire, acid vapours	Correctly design alimentation cables and protection elements. Wear protective mask.

**Maintenance**

Area	Cause	Danger	Safety note
reheat behind heat exchanger	Heat	Burns in case of contact to the skin	Wear safety gloves. Avoid contact to hot unit parts.
Heat exchanger	Sharp edges, fins	Injuries by cutting	Wear safety gloves.
Steam humidifier	Discharge of steam	Burns	Avoid area around the steam lance.
Electrical box	Live components, supposed to be voltage-free.	Electric shock	Secure master switch against being switched on again.

**Dismantling**

Area	Cause	Danger	Safety note
In the lower part of the unit, water piping	Unscrewing the water pipes still under pressure.	Discharge of water under high pressure, contact with the skin of ethylen glycol, increased risk of electric shock in combination with electricity, risk of slipping	Drain of cooling water by drain valve. Wear rubber gloves.
Electrical box	Live electrical alimentation cable	Electric shock	Check de-energized state of the alimentation before dismantling, Wear safety gloves.

## 3. Transport / Storage

### 3.1 Delivery of units

Stulz A/C units are mounted on pallets and packed several times in plastic film. They must always be transported upright on the pallets.

Construction of protective covering  
(from inside to outside)

1. Neoprene cushioning
2. Shrink film
3. Additional board in container shipments

The following information can be found on the packing.

- 1) Stulz logo
- 2) Stulz order number
- 3) Type of unit
- 4) Packing piece - contents
- 5) Warning symbols

also upon request

- 6) Gross weight
- 7) Net weight
- 8) Dimensions
- 9) Customer order number
- 10) Additional customer requirements



**When delivery is accepted, the unit is to be checked against the delivery note for completeness and checked for external damage which is to be recorded on the consignment note in the presence of the freight forwarder.**

- The delivery note can be found on the A/C unit when delivered.
- The shipment is made ex works, in case of shipment damages, please assert your claim towards the carrier.
- Hidden damage is to be reported in writing **within 6 days** of delivery.

### 3.2 Transport

The Stulz A/C units can be moved by lifting devices with ropes, for this the ropes have to be fixed at the pallet, and the upper unit edges have to be protected by wooden laths or metal brackets in such a way that they could not be caved in.

You can move the unit still packaged on the pallet with a fork lift, if you take care that the centre of gravity is within the fork surface. Take care that the unit is in an upright position at the transport.



**Never move the unit on rollers and never transport it without pallet on a fork lift, for the risk of distorting the frame.**

### 3.3 Storage

If you put the unit into intermediate storage before the installation, the following measures have to be carried out to protect the unit from damage and corrosion:

- Make sure that the water connections are provided with protective hoods. If the intermediate storage exceeds 2 months, we recommend filling the pipes with nitrogen.
- the temperature at the storage point should not be higher than 42°C, and the site should not be exposed to direct sunlight.
- the unit should be stored packaged to avoid the risk of corrosion especially of the condenser fins.

## 4. Description

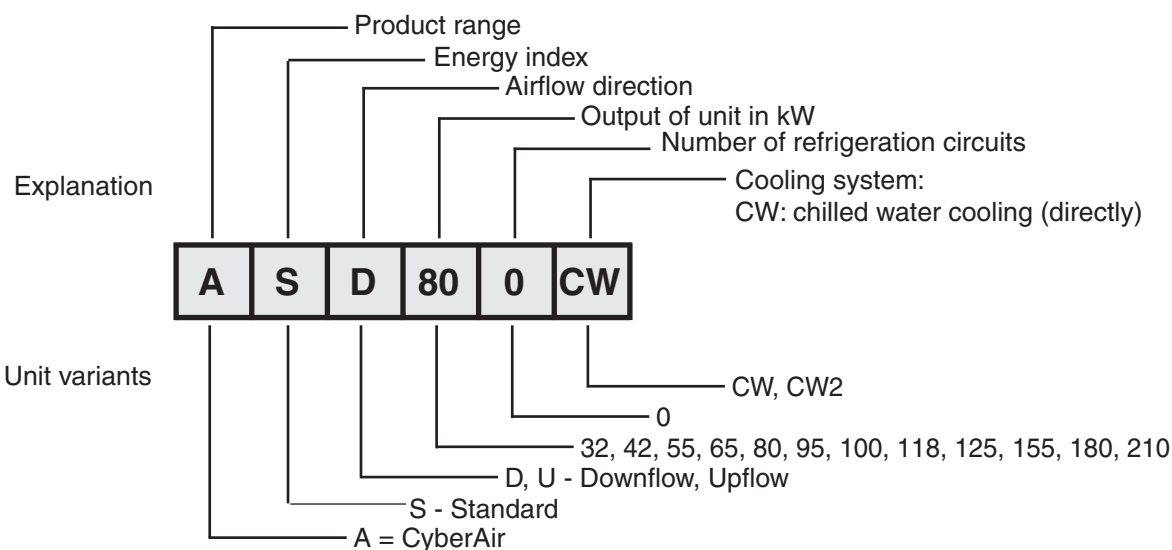
### 4.1 Type code

The type code represents the unit variant of your A/C unit and can be found on the rating plate.

The rating plate is located in the door in front of the electrical compartment.

Unit type	Typ type type	<b>ASD 800 CW</b> <b>12345645445</b>	Versorgungsspannung supply voltage tension de service	<b>400 V ± 10%</b> <b>50 Hz ± 1%</b>
internal part no.	Artikel-Nr. Item-no. numéro d'article	<b>A99648</b>	Kältemittel refrigerant refrigerant	<b>Water/Glycol</b>
Order number + alternative	Kommission/Alt commission/alt commission/alt	<b>0530111234/01</b>	Max. Betriebsdruck max. operation pressure pression de fonction max.	<b>16 bar</b>
Serial no.	Baujahr model modele	<b>2011</b>	Max. Füllgewicht max. filling charge charge max. de rempliss.	<b>--- kg</b>
	S.Nr. s.-no. no. serie	 <b>1234567890</b>		

**Made in Germany**



### Page code

**EN/ 08.2011 / 18 / 7**

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EN - English  
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number

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### Manufacturer address:

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**Tel: +49 40 55 85-0**  
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## 4.2 Intended use

This A/C unit is used to control room temperature and air humidity. The A/C unit is designed for indoor installation. Any use beyond this is not deemed to be use as intended. STULZ is not liable for any damage resulting from such misuse. The operator alone bears the risk.

## 4.3 Function of the A/C unit

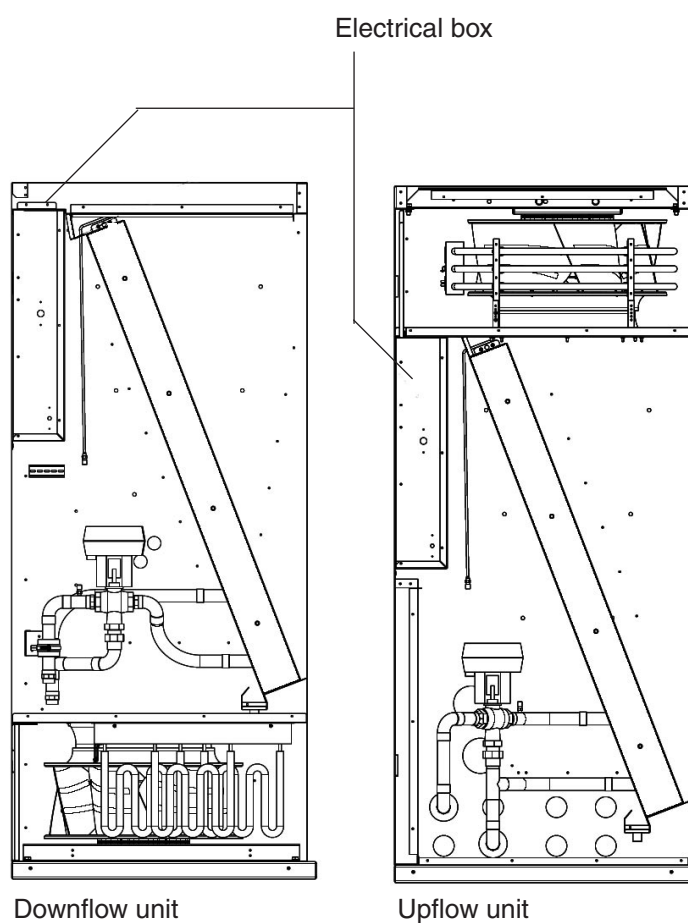
The A/C unit is exclusively operated by the controller in the front panel and the main switch in the electric box. To adapt the airflow to the needs of the system the fan speed can be adjusted gradually at the controller by means of a 0-10V signal. Minimum speed corresponds to 4V.

At the air inlet a temperature and humidity sensor is installed. The setpoints can be set at the controller.

To control the supply air temperature the controller adjusts the 3 way valve, which is part of the chilled water circuit and controls the amount of chilled water which flows through the chilled water coil. For optional heating two variants are available: electrical heating and hot water reheat

To achieve a dehumidification, the fan speed is reduced (dehumidifying circuit). A humidification can be obtained by using the optional humidifier.

The A/C unit control is effected by the on board I/O controller. The operational conception is designed such as to allow to control up to 19 units from one unit. These units can be installed separately with a maximum control line length of 1000 m.



## 5. Technical data

### 5.1 Application limits

The STULZ CyberAir 3 CW units are provided for operation within the following ranges:

- Admissible return air conditions:

Temperature:

Lower limit: 18°C

Upper limit: 35°C

Humidity:

Lower limit: 5,5°C dew point

Upper limit: 60% r.h. and 15°C dew point

- Chilled water conditions:

min. temperature at the unit inlet: 5°C

min temp. difference with 5°C EWT: 5 K

max. head pressure: 16 bar

- Storage conditions:

Temperature [°C]: -20 - +42

Humidity [% rel. h.]: 5 - 95

Atmosphere pressure [kPa]: 70 - 110

- Voltage: **Standard**

380V / 3ph / 50Hz; N; PE 380V / 3ph / 60Hz; N; PE

**400V / 3ph / 50Hz; N; PE** 460V / 3ph / 60Hz; PE

415V / 3ph / 50Hz; N; PE

- Voltage tolerance: +/- 10%

- Frequency: 50 Hz +/- 1%

60 Hz +/- 1%

- Hot water conditions for optional heating coil:

max. inlet water temperature: 110°C

max. water head pressure: 8.5 bar

The warranty is invalidated for any possible damage or malfunction that may occur during or in consequence of operation outside the application ranges.

### Design conditions for technical data:

Electrical connection:

400V/3ph/50Hz

for Downflow units with an external static pressure:

20 Pa

for Upflow units with an external static pressure:

50 Pa

#### CW Units

Return air conditions for cooling capacity:

24°C, 50% rel. humidity

EWT - Entering water temperature:

7°C

LWT - Leaving water temperature:

12°C

Cooling fluid:

Water, 0% Glycol

The sound pressure levels are valid at a height of 1 m and distance of 2 m in front of the unit under free field conditions and with nominal data. The values take into account the effects of all installation and design parts contained in the standard unit. The values for upflow units assume an installed discharge duct.

## 5.2 Technical Data - ASD ... CW

Type		320	420	550	650	800	950	1000	1180
CW-cooling capacity 24°C/50% r.H.	total sensible kW	30,1 26,7	38,2 34,0	54,0 42,9	67,5 54,5	83,7 66,6	100,4 79,7	112,6 85,5	125,9 96,3
Airflow	m³/h	7000	9000	10000	13000	15500	18500	19000	21500
Return air filter class		G4	G4	G4	G4	G4	G4	G4	G4
Water flow	m³/h	5,2	7,2	9,3	11,7	14,5	17,4	19,5	21,8
Pressure loss, water side	kPa	34	53	55	85	42	61	58	72
CW valve size (3-way)	inch	1 1/4"		1 1/2"		2"			
Content of water	dm³	20,1		30,7		58,8		72,4	
Sound pressure level	dBA	50,4	57,1	53,4	60,4	60,6	65,0	60,8	63,9
Cabinet size <sup>1</sup>		1		2		3		4	
Weight	kg	281		350		503		586	

Type		1250	1550	1800	2100
CW-cooling capacity 24°C/50% r.H.	total sensible kW	135,2 105,1	159,4 126,1	184,0 144,2	214,0 168,8
Airflow	m³/h	24000	29000	33000	39000
Return air filter class		G4	G4	G4	G4
Water flow	m³/h	23,4	27,5	31,8	37,0
Pressure loss, water side	kPa	74	105	67	91
CW valve size (3-way)	inch	2"		2 1/2"	
Content of water	dm³	84,0		108,5	
Sound pressure level	dBA	59,4	64,3	61,4	65,5
Cabinet size <sup>1</sup>		5		7	
Weight	kg	688		870	

## 5.3 Technical Data - ASU ... CW

Type		320	420	550	650	800	950	1000	1180	1250	1550
CW-cooling capacity 24°C/50% r.H.	total sensible kW	30,1 26,7	38,2 34,0	54,0 42,9	67,5 54,5	77,7 64,9	92,9 77,2	100,3 80,2	115,9 92,7	127,7 102,3	153,9 123,2
Airflow	m³/h	7000	9000	10000	13000	16000	19000	19000	22000	24000	29000
Return air filter class		G4	G4	G4	G4	G4	G4	G4	G4	G4	G4
Water flow	m³/h	5,2	6,6	9,3	11,7	13,4	16,1	17,3	20,0	22,1	26,6
Pressure loss, water side	kPa	33	52	55	85	32	45	54	71	68	97
CW valve size (3-way)	inch	1 1/4"		1 1/2"		2"		2"		2"	
Content of water	dm³	20,1		30,7		60,0		73,6		85,2	
Sound pressure level	dBA	52,8	59,1	55,4	62,2	55,1	58,9	55,6	58,8	61,2	65,9
Cabinet size <sup>1</sup>		1		2		3		4		5	
Weight (standard)	kg	282		351		514		605		721	

<sup>1</sup> Dimensions, see following pages.

For electrical data, (fan power consumption) see e-data sheet.

The electrical power consumption of the fans must be added to the room load.

## 5.4 Technical Data - ASD ... CW2

Type			270	510	670	810	1070	1170
CW-cooling capacity 24°C/50% r.H.	total sensible	kW	31,3 28,3	49,3 42,6	68,2 60,7	86,3 74,7	107,6 93,4	137,2 120,7
Airflow		m³/h	8500	11500	17500	21000	26000	36000
Return air filter class			G4	G4	G4	G4	G4	G4
Water flow		m³/h	5,4	8,5	11,8	14,9	18,6	23,7
Pressure loss, water side		kPa	109	79	69	91	111	85
CW valve size (3-way)		inch	1	1 1/4	1 1/2	2	2	2
Content of water		dm³	11,7	28,7	36,6	47,4	56,3	71,6
Sound pressure level		dBA	55,0	56,7	57,2	57,5	57,7	59,0
Cabinet size <sup>1</sup>			1	2	3	4	5	7
Weight		kg	293	380	461	553	644	844

## 5.5 Technical Data - ASU ... CW2

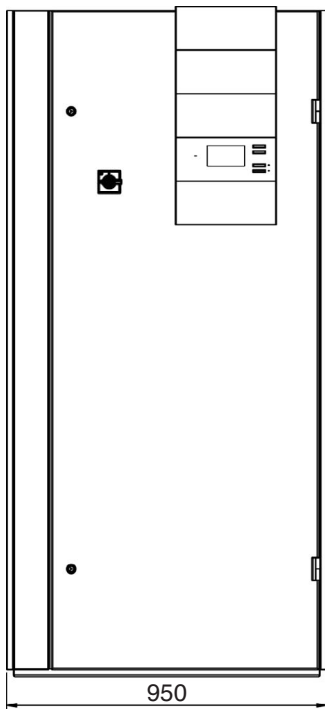
Type			270	510	670	810	1070
CW-cooling capacity 24°C/50% r.H.	total sensible	kW	31,3 28,3	46,1 39,7	66,3 59,1	83,3 71,9	107,6 93,4
Airflow		m³/h	8500	10500	17000	20000	26000
Return air filter class			G4	G4	G4	G4	G4
Water flow		m³/h	5,4	8,0	11,5	14,4	18,6
Pressure loss, water side		kPa	106	73	65	83	120
CW valve size (3-way)		inch	1	1 1/4	1 1/2	2	2
Content of water		dm³	11,7	28,7	36,6	47,4	56,3
Sound pressure level		dBA	57,2	57,4	58,9	58,8	58,9
Cabinet size <sup>1</sup>			1	2	3	4	5
Weight		kg	296	384	476	573	718

<sup>1</sup> Dimensions, see following pages.

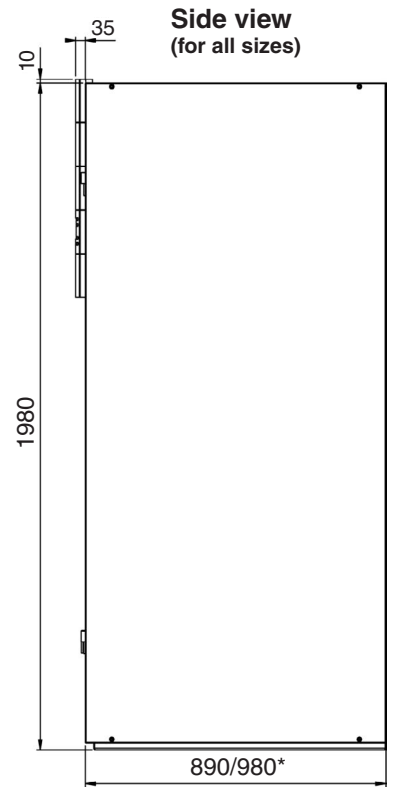
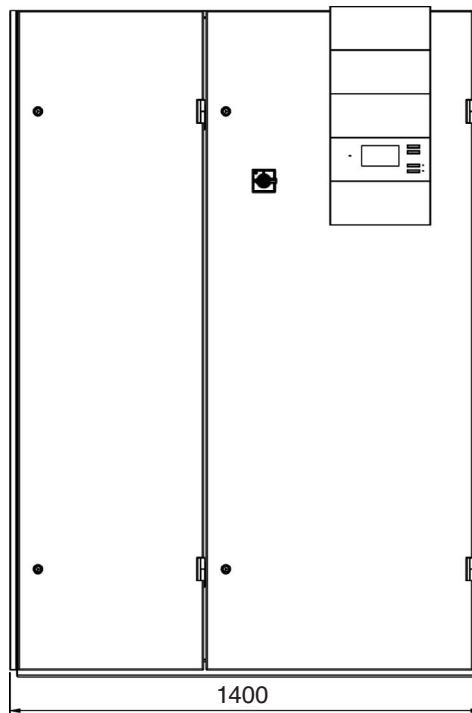
For electrical data, (fan power consumption) see e-data sheet.  
The electrical power consumption of the fans must be added to the room load.

## 5.6 Dimensional drawings

Cabinet size 1

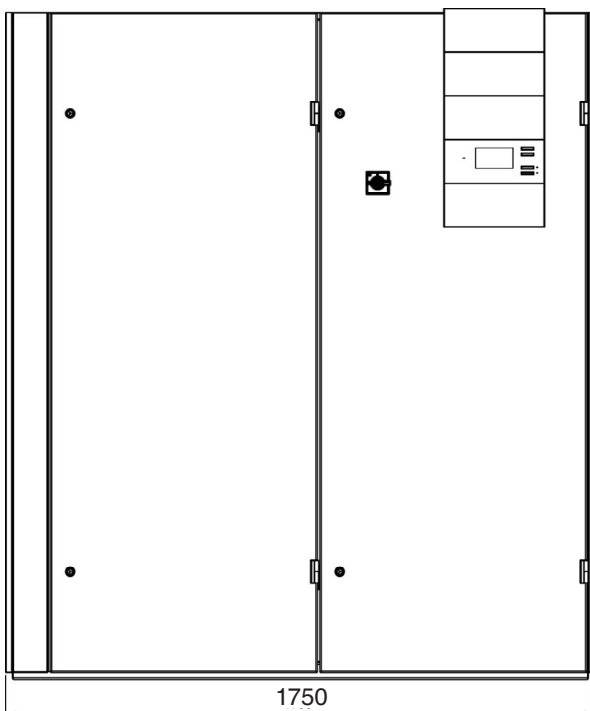


Cabinet size 2

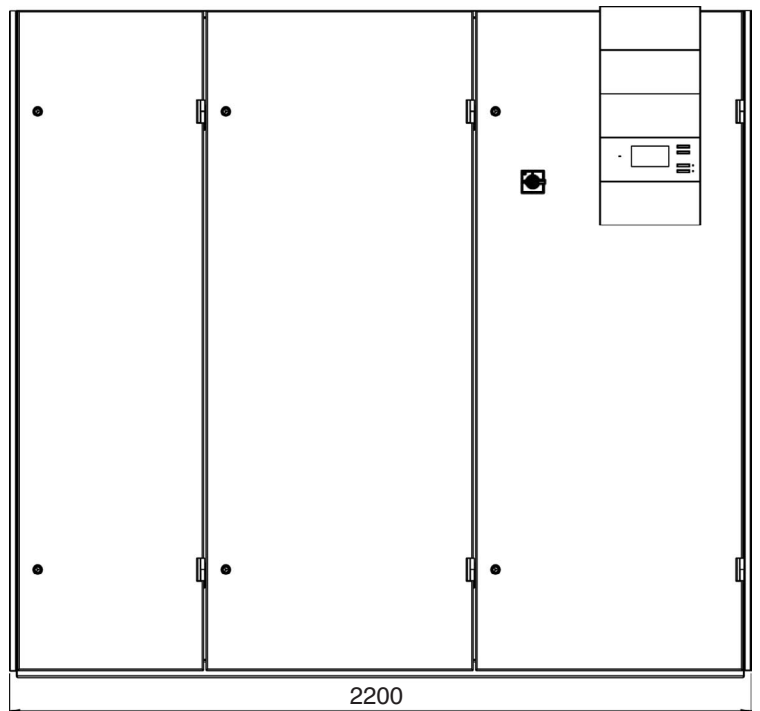


\* for cabinet size 7

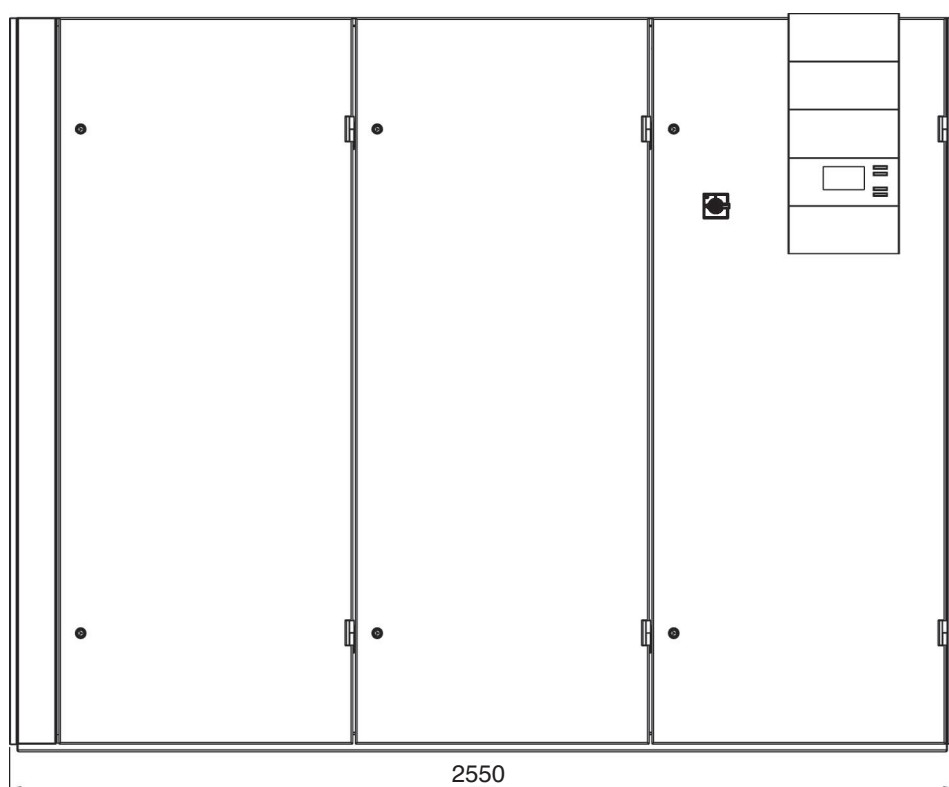
Cabinet size 3



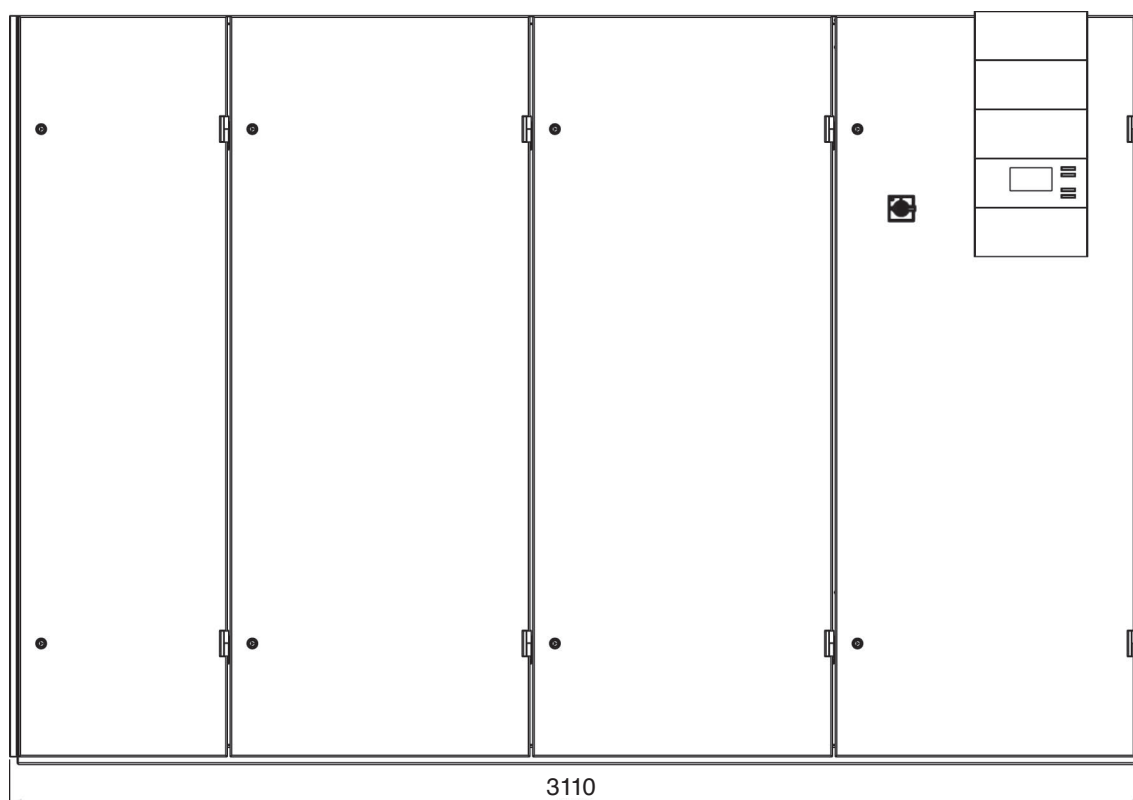
Cabinet size 4



**Cabinet size 5**



**Cabinet size 7**



## 6. Installation

### 6.1 Positioning

Check that the installation site is appropriated for the unit weight, which you can read in the technical data.

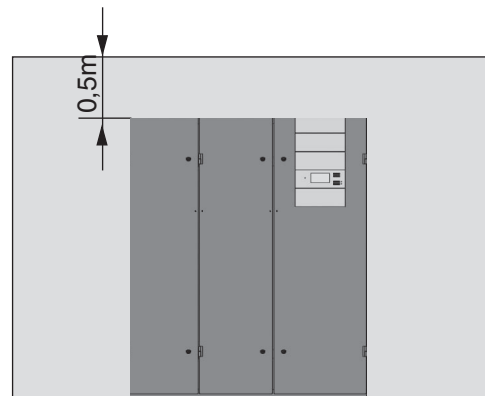
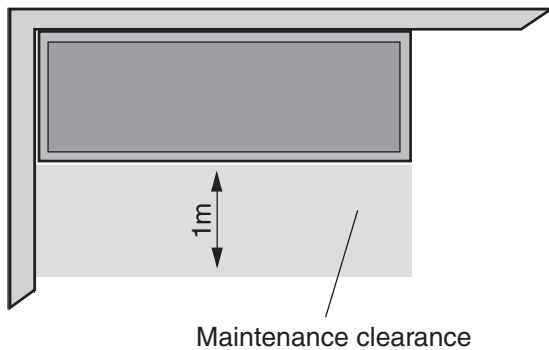
The A/C unit is designed for the inside installation on a level base. The solid base frame contributes significantly to an even weight distribution. When selecting the installation site take into account the necessary clearances for the maintenance and the air flow.

Children, unauthorized persons and animals may not have access to the installation site of the A/C unit.

The A/C unit should not be operated in office rooms or other rooms sensitive to noise.



**The unit may not be operated in an explosive atmosphere!**



Air intake area for Downflow units and air outlet area for Upflow units without duct connection

## 6.2 Water piping connection

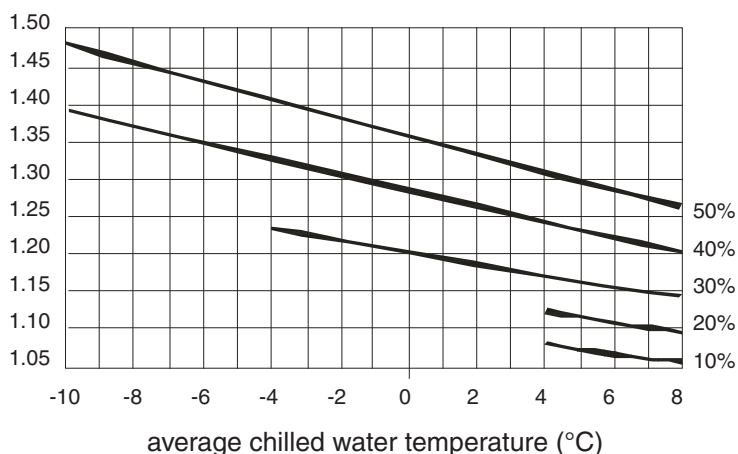
### External water circuit

To seal the water circuit you must connect the unit to a chilled water ring mains, which contains for the generation of cold water either a chiller or a dry cooler or cooling tower. If the water quality is insufficient, we recommend the additional installation of a fine mesh strainer.

For an efficient protection against corrosion, the anti-freezing agent is mostly sufficient, which should be used if the water temperature passes under 5°C or if the outside temperature is less than 0°C. We recommend to add the following quantities of ethylenglycol (indicated as percentage of weight of the water quantity) :

water or outside air temperature	ethylenglycol
from +5 to -5°C	10%
from -5 to -10°C	20%
from -10 to -15°C	28%
from -15 to -20°C	35%
from -20 to -25°C	40%

correction coefficient for the pressure drop in the water circuit when using ethylenglycol



For connecting the unit to the external system remove the protective caps or sealing disks of the screwed connections.

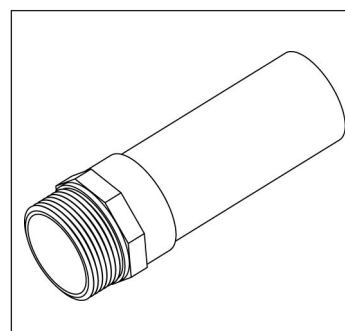


**Water remaining from the test run may escape when the protective caps are removed.**

The water connections end with an external thread. Screw the lines of the external system to the lines of the unit respecting the designation at the unit.

Insulate the water pipes with the diffusion tight insulating material, to prevent the introduction of ambient air heat and the formation of condensate at the pipes.

Fill and bleed air from the cooling water circuit by means of the filling connections and the schrader valves for bleeding (see refrigerant diagram).



Connection with external thread



## 6.2.1 Condensate drain connection

### Syphon installation

Ensure that there is a sufficient height difference between the condensate pan and the upper bow of the syphon or the highest part of the drain tube, in order to avoid a water column in the drain syphon caused by the pressure in the suction area of the A/C unit, which prevents the draining of the condensate water

Example: Static pressure in the suction area : -300Pa

$$h = p / (\rho \cdot g)$$

$$h = -300\text{Pa} / (1000\text{kg/m}^3 \cdot 10\text{m/s}^2)$$

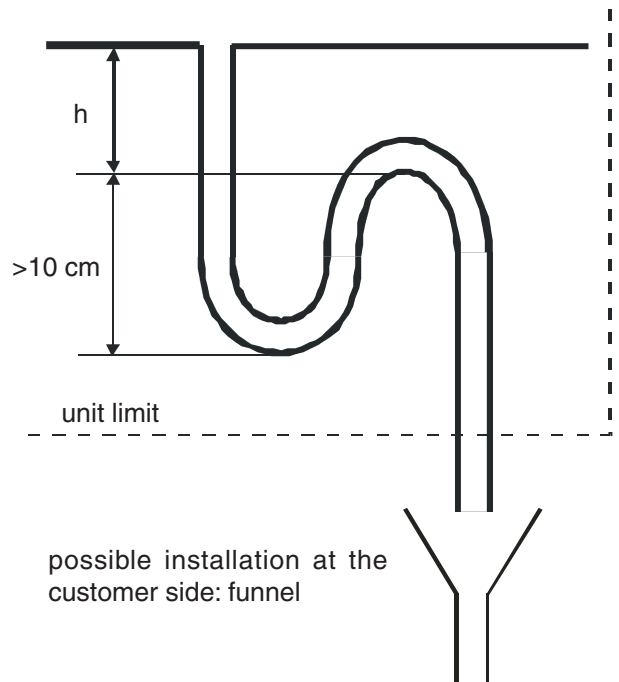
$$h = -3 \text{ cm}$$

If the height  $h$  is smaller than 3 cm with a pressure of 300 Pa in the suction area, a water column rests in the drain, the water is not transported and fills the condensate pan. This water can be drawn dropwise in the fan or can drop out of the unit if the pan is full.

Connect the condensate water drains to the local waste water system.



**Comply with the regulations of the local water supply authority.**

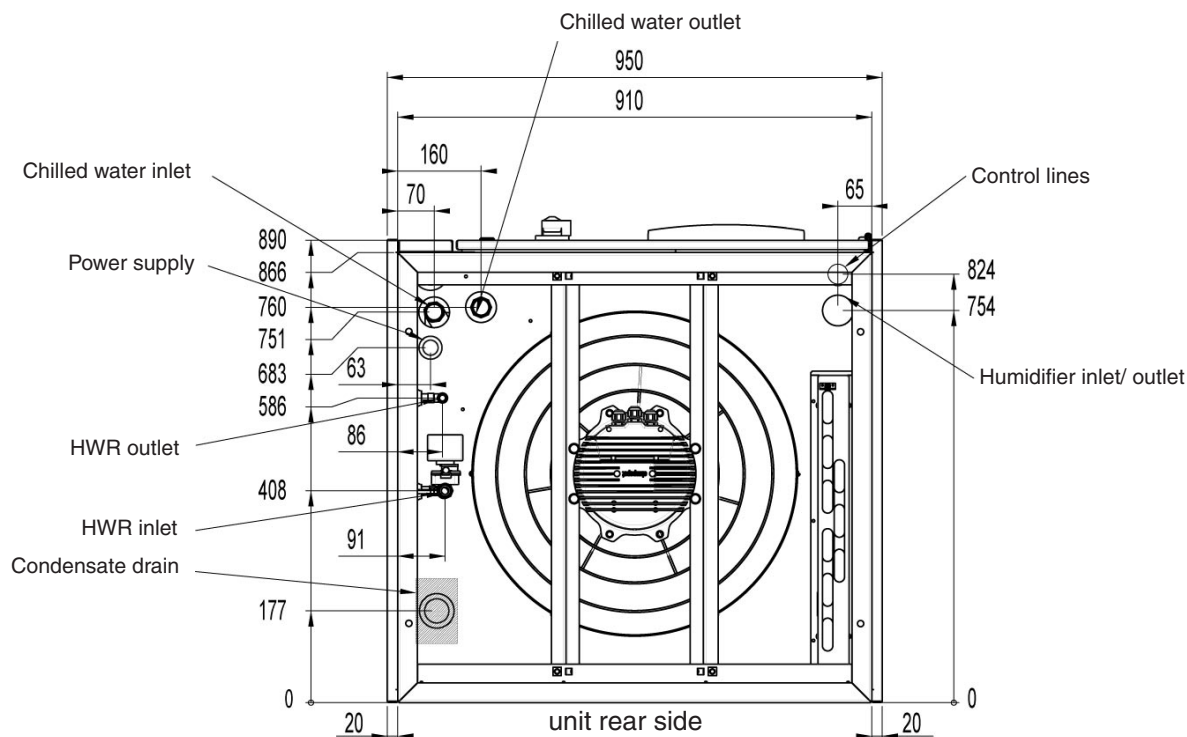


## 6.2.2 Pipe entrance area - Downflow version, single circuit

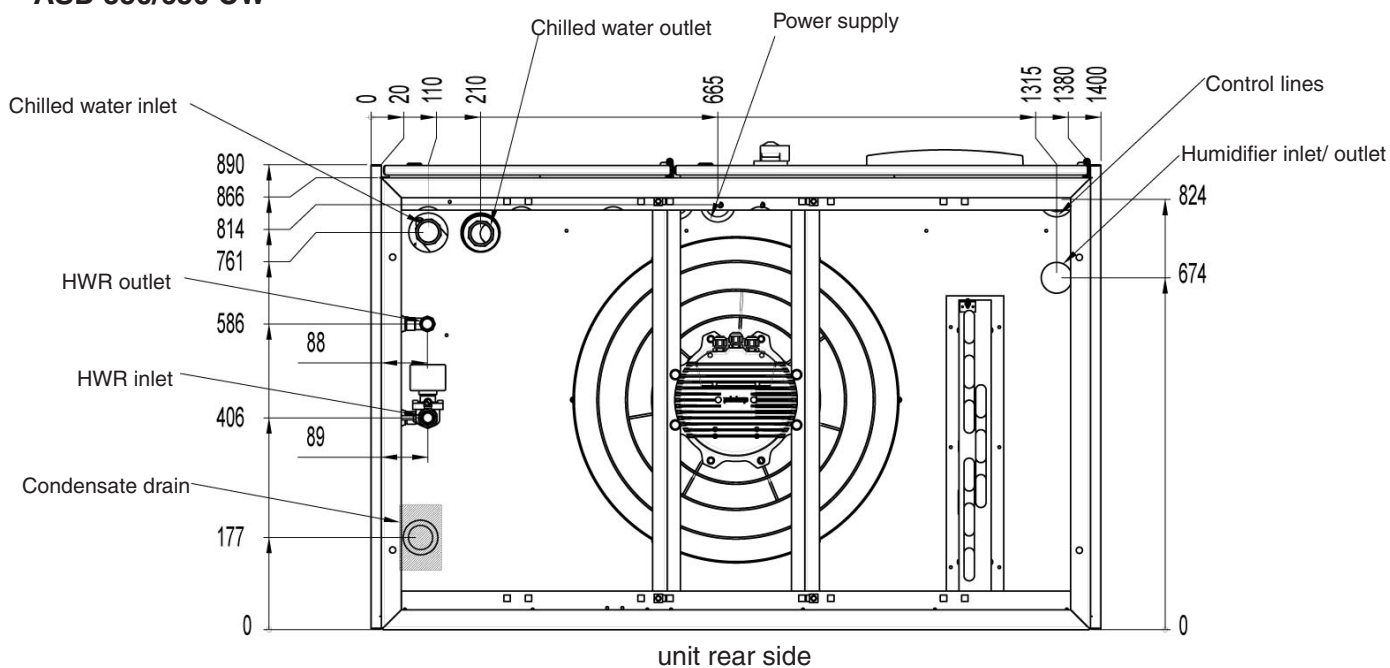
At Downflow units the supply pipes and cables are introduced from the bottom through openings in the base plate. The unit bottom views are displayed following.

### ASD 320/420 CW

#### Bottom view



### ASD 550/650 CW



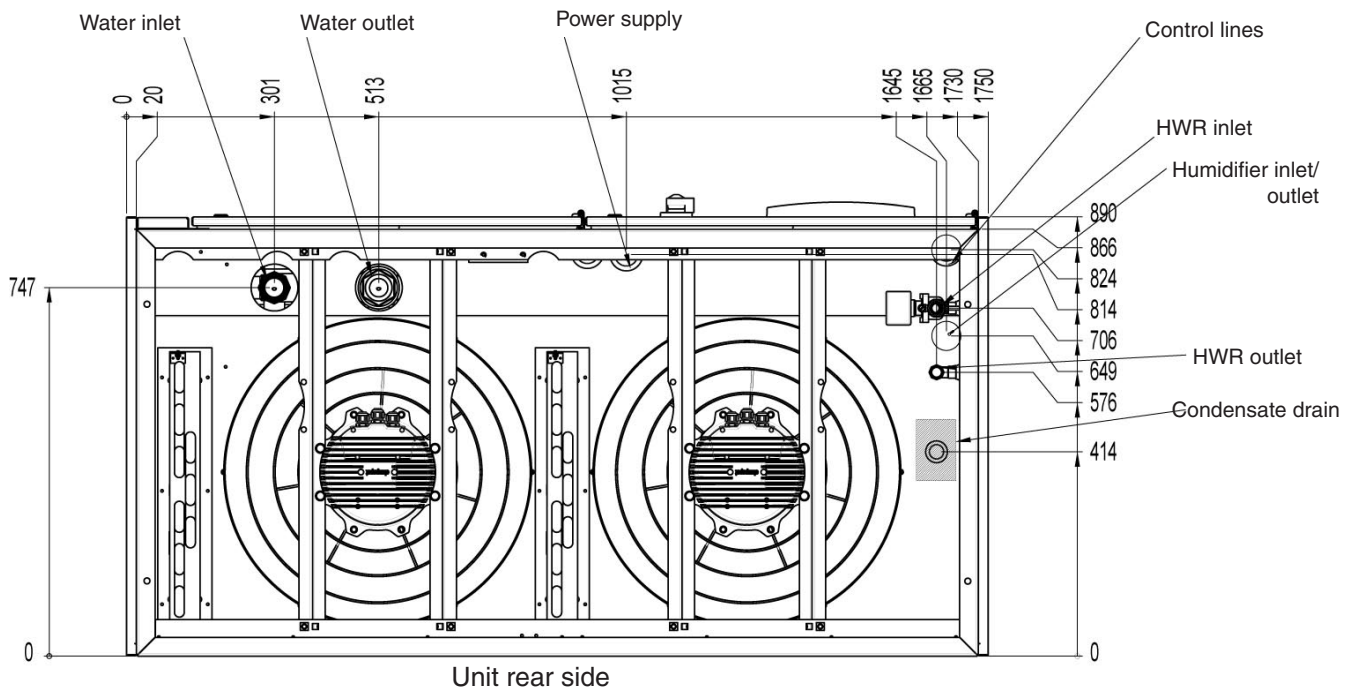
#### Diameter of the chilled water lines

ASD...CW		320	420	550	650
Ø by client	mm	35		42	
external thread	inch	R 1 1/4		R 1 1/2	

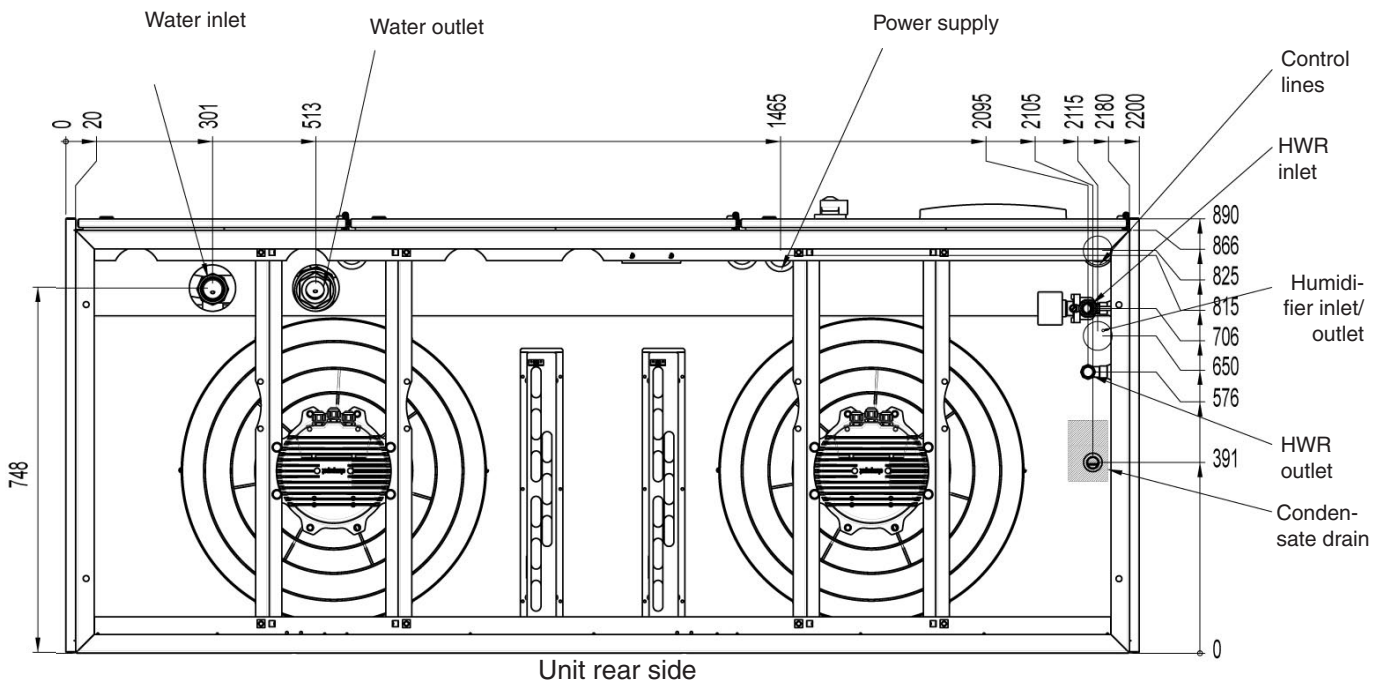
**D**

**Bottom view**

**ASD 800/950 CW**



**ASD 1000/1180 CW**



HWR: Hot water reheat

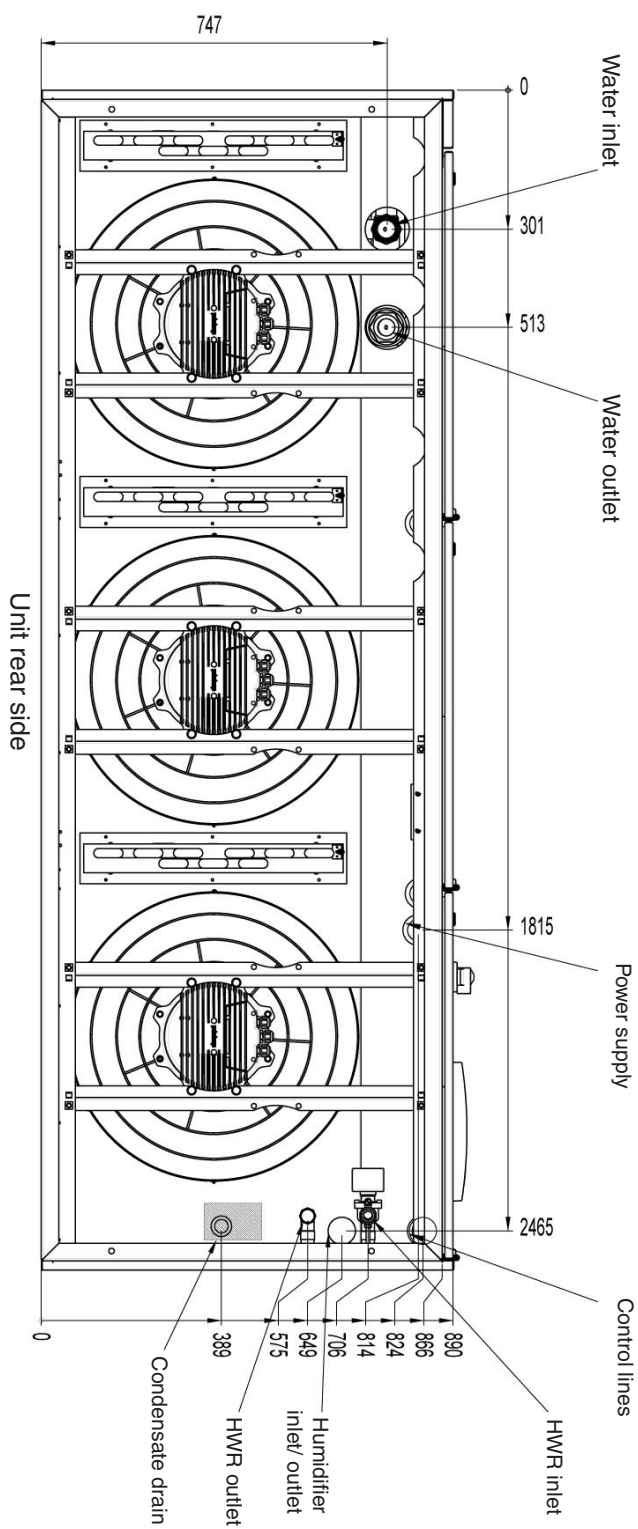
**Diameter of the chilled water lines**

ASD...CW		800	950	1000	1180
Ø by client	mm	54		64	
external thread	inch	R 2		R 2	

**D**

**Bottom view**

**ASD 1250/1550 CW**

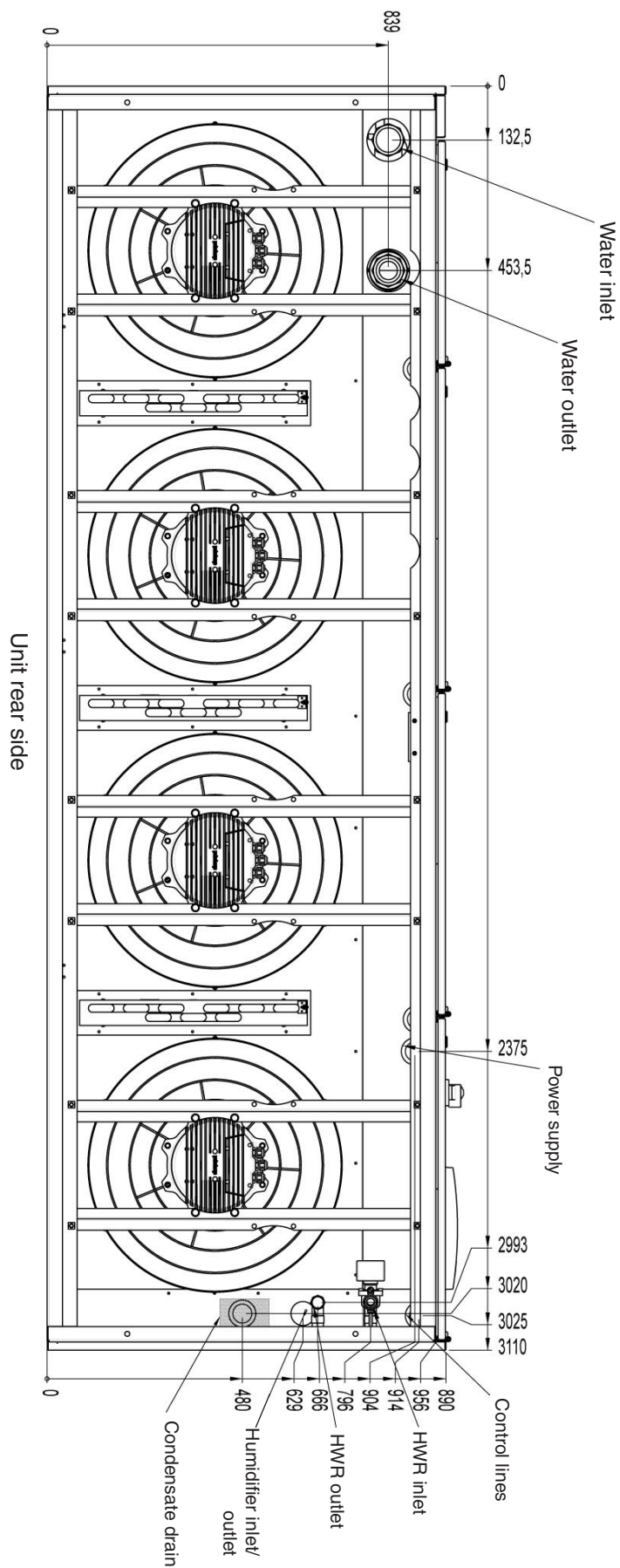


**Diameter of the chilled water lines**

ASD...CW	1250	1550
Ø by client	mm	64
external thread	inch	R 2

# ASD 1800/2100 CW

## Bottom view



## Diameter of the chilled water lines

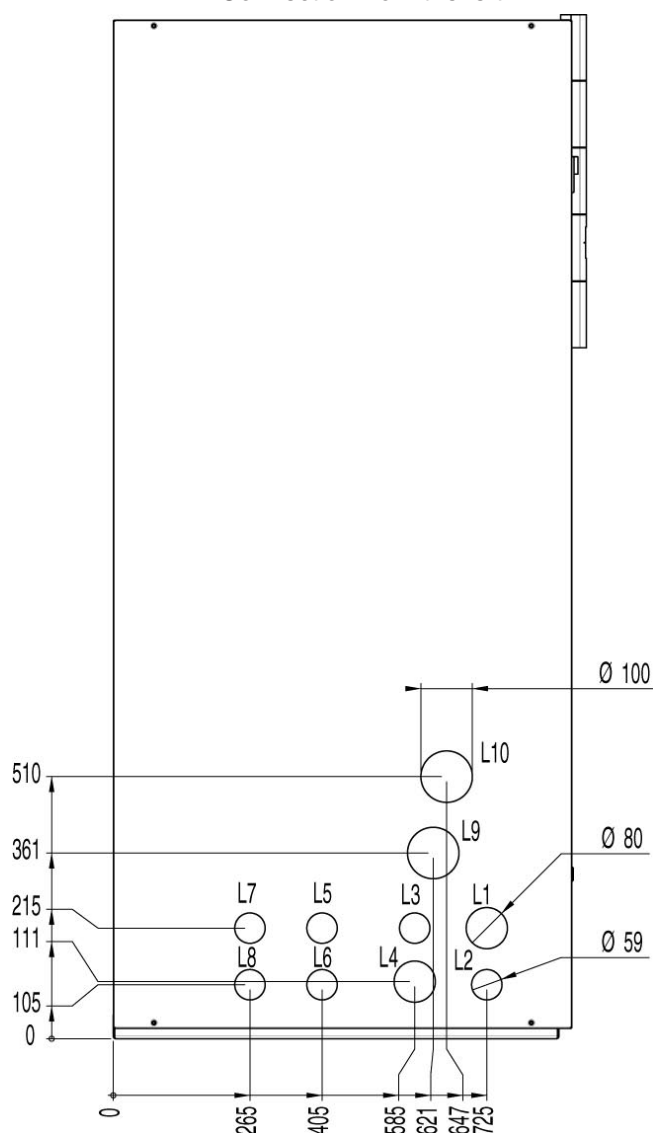
ASD...CW		1800	2100
Ø by client	mm	64	
external thread	inch	R 2 1/2	



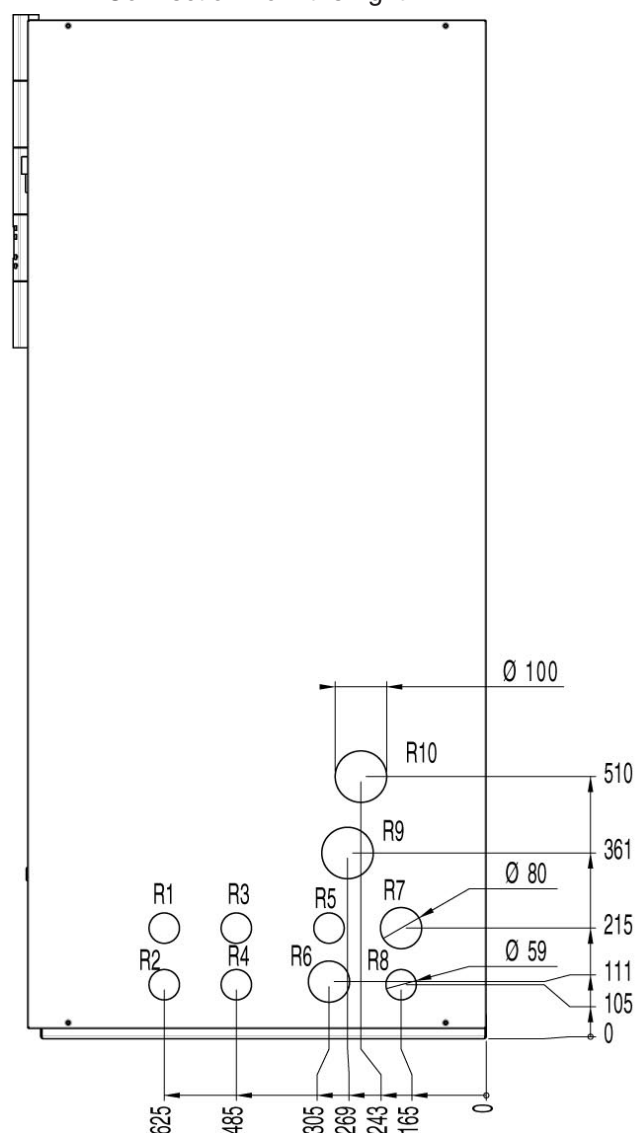
### 6.2.3 Pipe entrance area - Upflow units, single circuit

At Upflow units the supply pipes and cables are introduced from the left or right side through openings in the side wall.

Connection from the left



Connection from the right



ASU ... CW	320/420	550/650	800/950	1000/1180	1250/1550
Ø Chilled water line, by client [mm]	35	42	54	64	64
external thread [inch]	1 1/4"	1 1/2"	2"	2"	2"
Water inlet	L4	L4	L10	L10	L10
Water outlet	L1	L1	L9	L9	L9
Condensate drain	L8	L8	R4	R4	R4
Power supply	R2	R2	R2	R2	R2
HWR inlet	R4	R4	-*	-*	-*
HWR outlet	R5	R5	-*	-*	-*
Humidifier inlet/outlet	R8	R8	R8	R8	R8

All dimensions in mm.

The openings R1, R9 and R10 can not be used.

\* the installation of a hot water reheat is not possible in these units.

#### Notes:

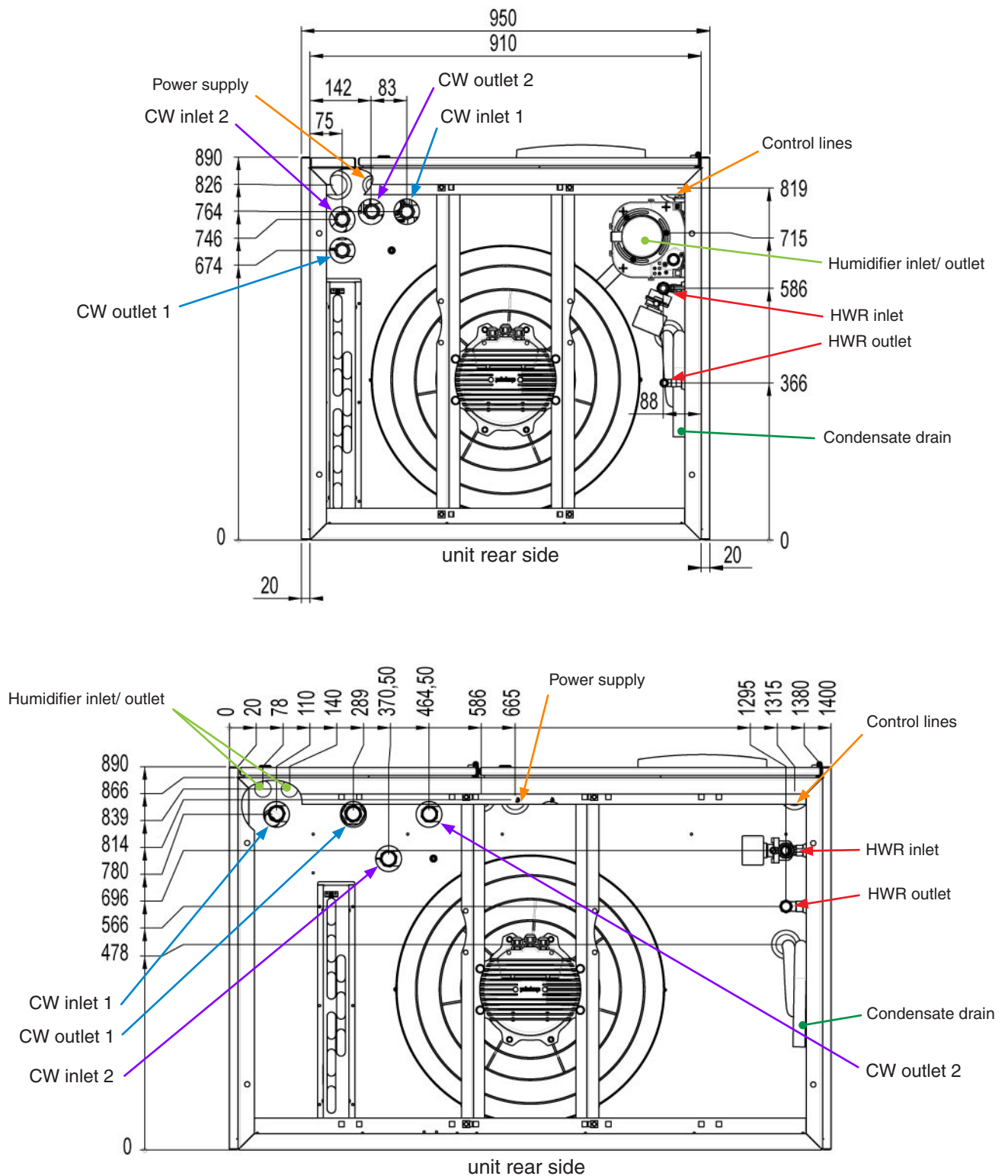
For the routing of the piping into the unit there are sometimes several possibilities. The most favourable openings are those which are recommended in the tables. The lines for the power supply, the humidifier connections and the condensate drain can be routed through the remaining openings as desired.



### 6.2.4 Pipe entrance area - Downflow version, dual circuit

At Downflow units the supply pipes and cables are introduced from the bottom through openings in the base plate. The unit bottom views are displayed following.

Bottom view



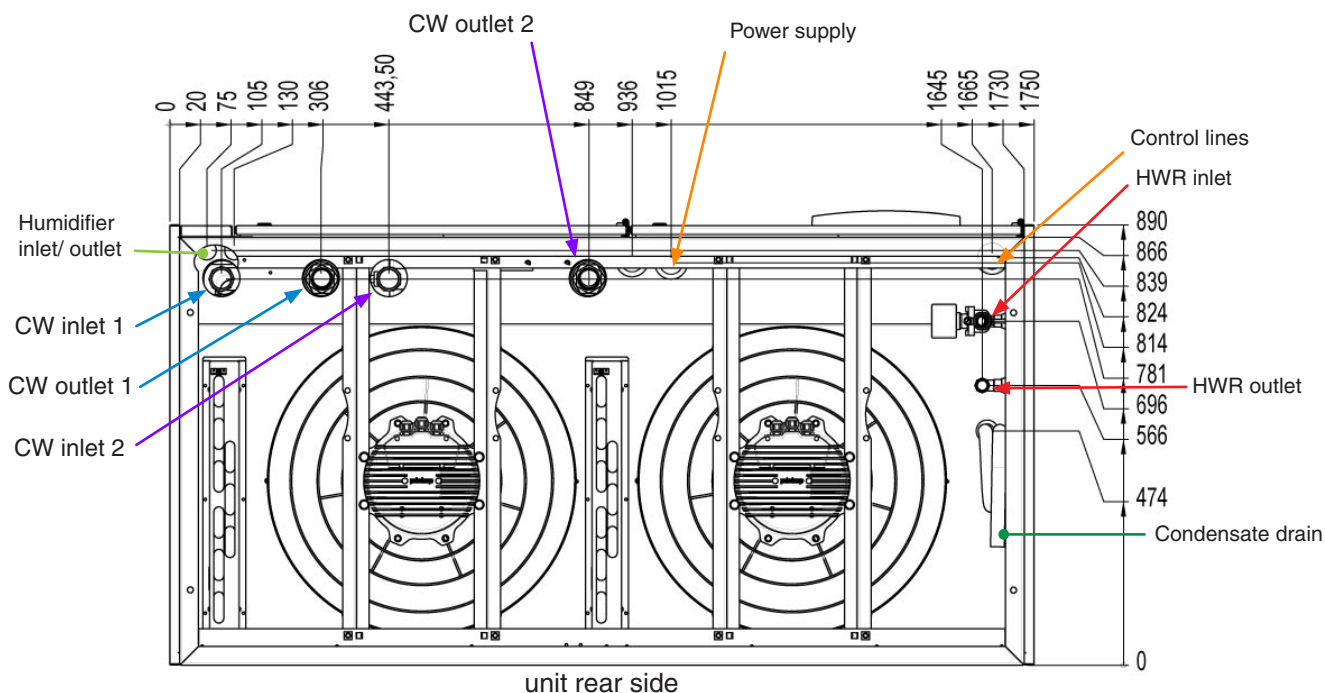
#### Diameter of the chilled water lines

ASD...CW2		270	510
Ø by client	mm	35	42
external thread	inch	R 1 1/4	R 1 1/2

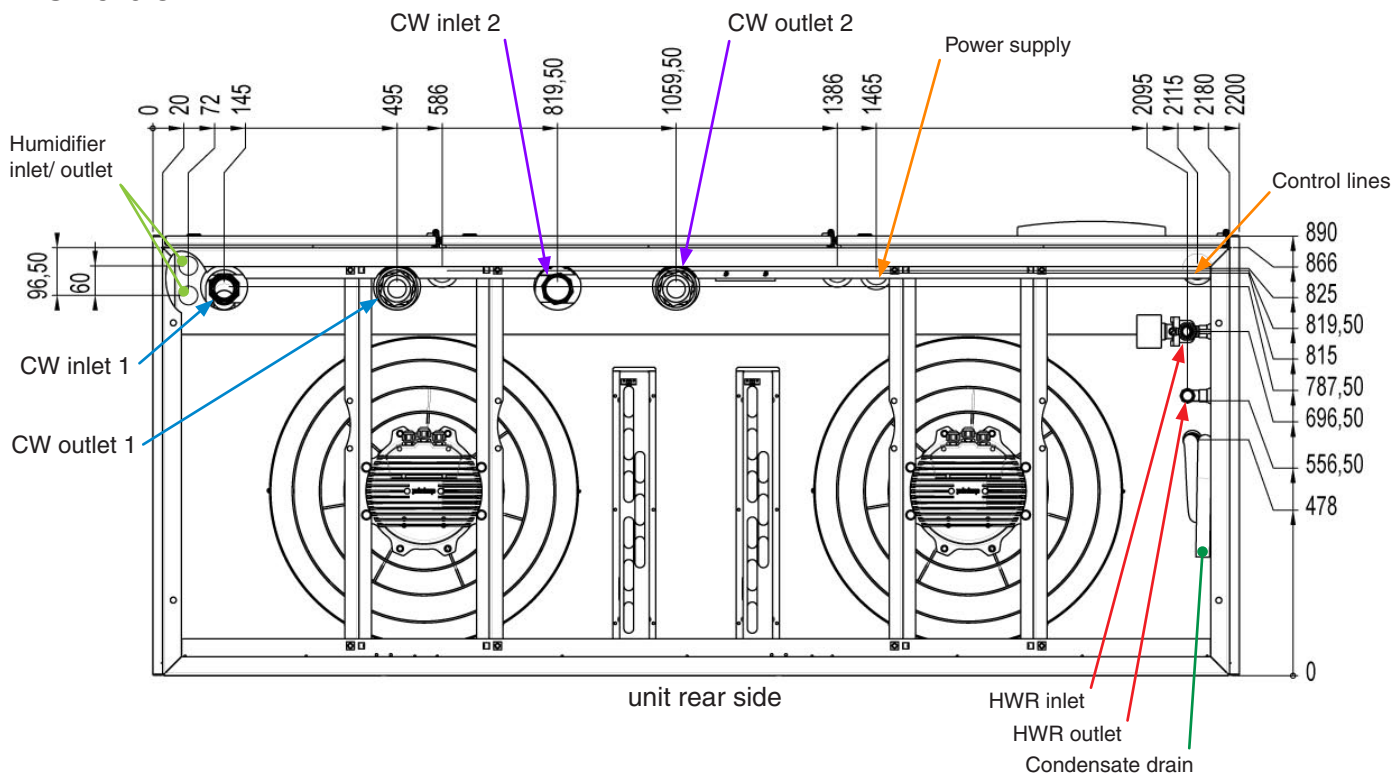
CW: chilled water  
HWR: hot water reheat  
1: circuit 1  
2: circuit 2

## ASD 670 CW2

### Bottom view



## ASD 810 CW2



### Diameter of the chilled water lines

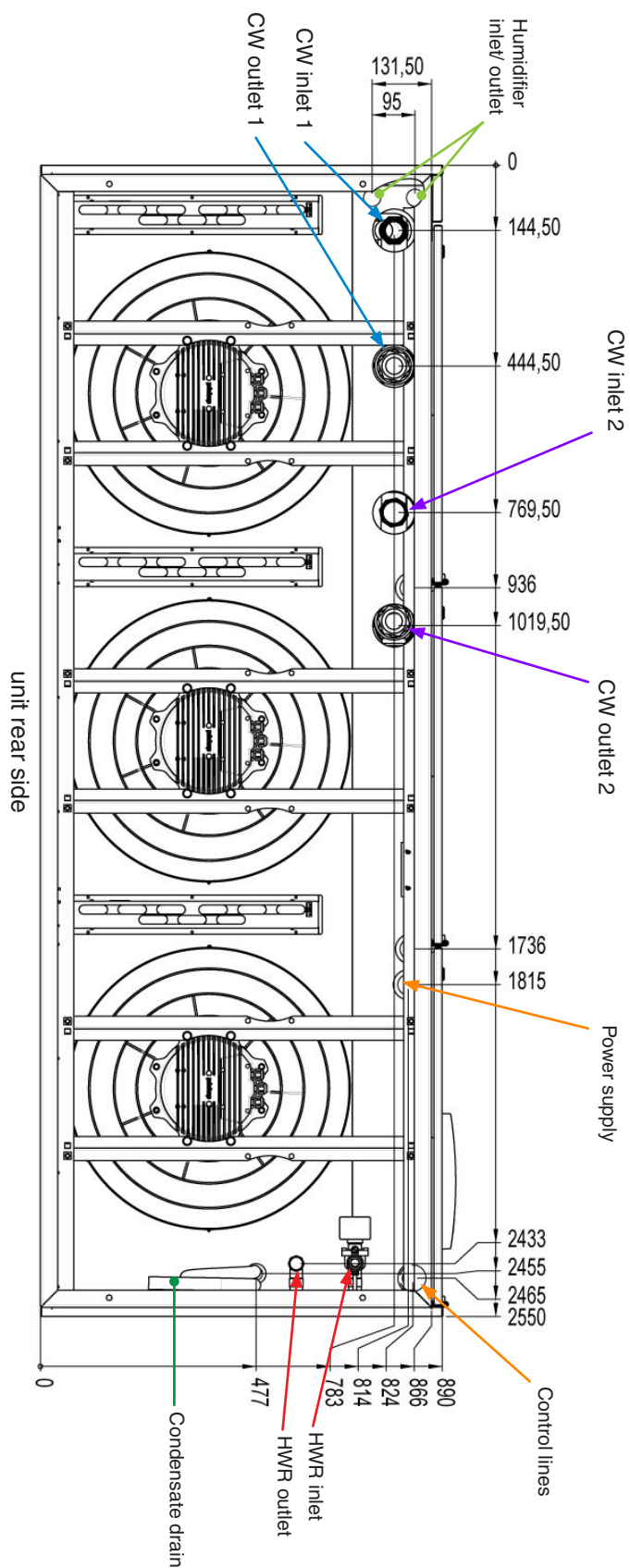
ASD...CW2		670	810
Ø by client	mm	42	54
external thread	inch	R 1 1/2	R 2

CW: chilled water  
HWR: hot water reheat  
1: circuit 1  
2: circuit 2



# ASD 1070 CW2

## Bottom view



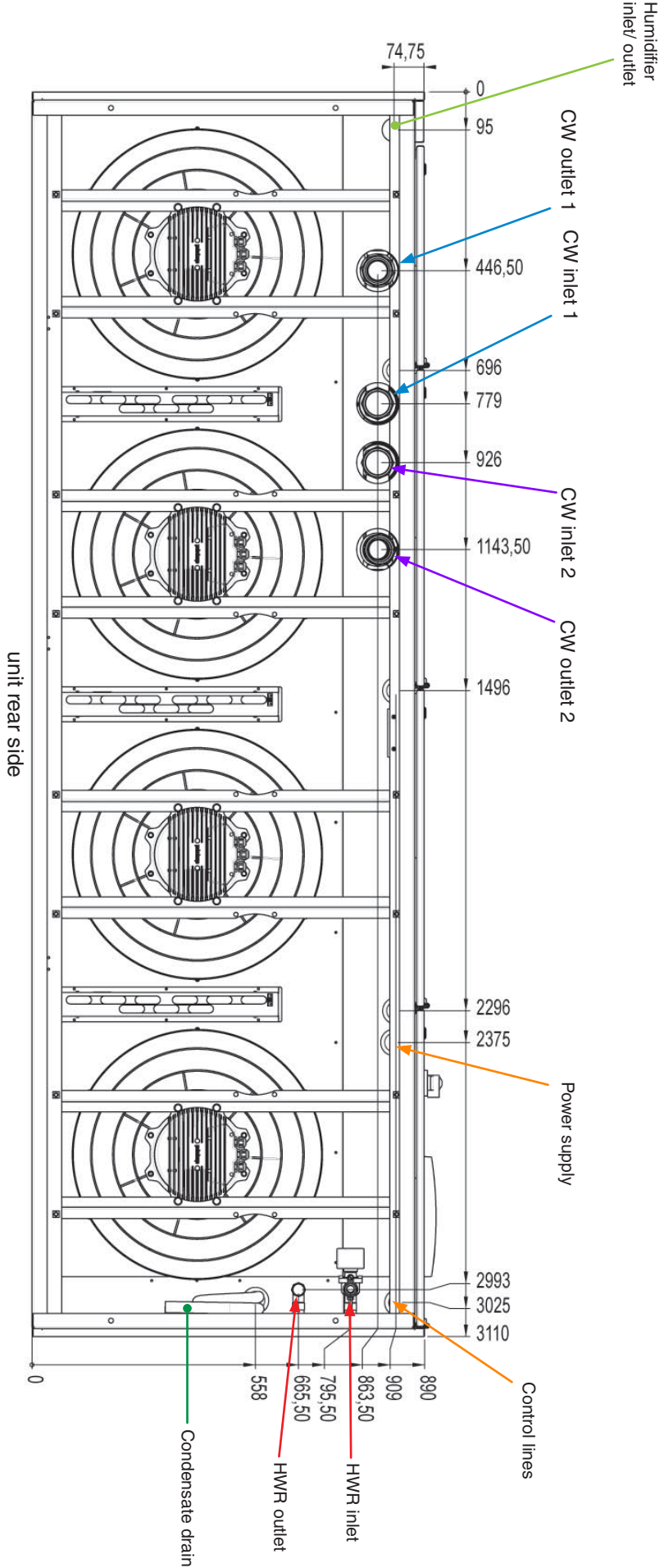
### Diameter of the chilled water lines

ASD...CW2	1070
Ø by client	mm 64
external thread	inch R 2

CW: chilled water  
HWR: hot water reheat  
1: circuit 1  
2: circuit 2

ASD 1170 CW2

Bottom view



Diameter of the chilled water lines

ASD...CW2	1170
Ø by client	mm 64
external thread	inch R 2

CW: chilled water  
HWR: hot water reheat  
1: circuit 1  
2: circuit 2

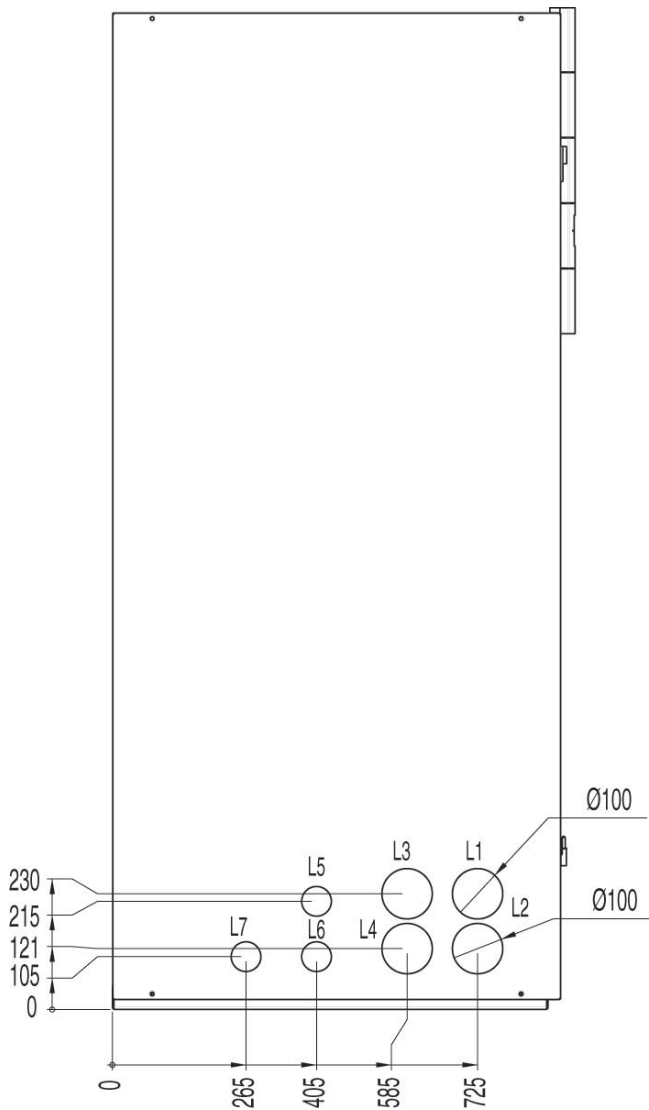


### 6.2.5 Pipe entrance area - Upflow units, dual circuit

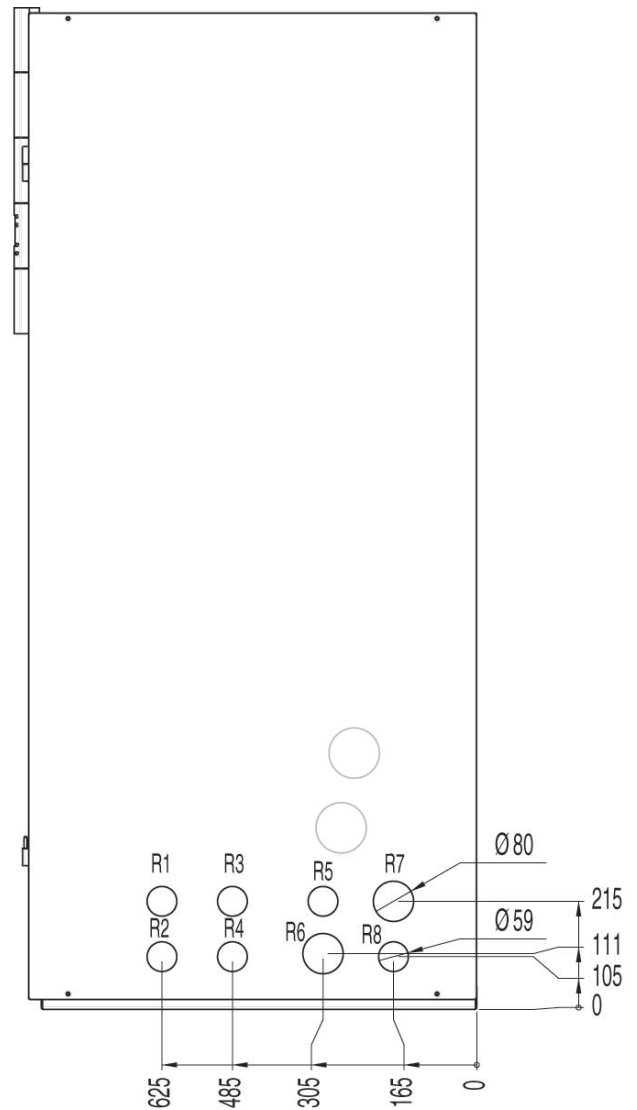
At Upflow units the supply pipes and cables are introduced from the left or right side through openings in the side wall.

In units of version CW2 there are 4 water connections in total (2x water inlet, 2x water outlet).

Connection from the left



Connection from the right



The openings R1 and R5 can not be used.

#### Designated use of openings

L1	Water inlet, circuit 2
L2	Water outlet, circuit 2
L3	Water inlet, circuit 1
L4	Water outlet, circuit 1
L6	Condensate drain
R2	Humidifier inlet/outlet
R4	HWR inlet
R6	HWR outlet
R8	Power supply

#### Diameter of the chilled water lines

ASU ... CW2	270	510	670	810	1070	1170
Ø Chilled water line, by client [mm]	35	42	42	54	64	64

All dimensions in mm.

## 6.3 Electrical connection



Ensure that the electric cables are de-energized.

The electric cables are only to be connected by an authorised specialist.

The unit must dispose of an effective earthing.



Do not touch electronical components, without taking care of protective ESD measures.

The power supply system on site and the pre-fuses must be designed for the total current of the unit (see technical data).

Route the electric cable into the electrics box from below and connect the three phases to the main switch, the PE conductor at the PE rail and the neutral conductor at the neutral terminal, in accordance with the wiring diagram (part of the unit documents) and secure these cables by the pull relief screw.



Make sure that the phase rotation is correct, the rotating field must turn right !



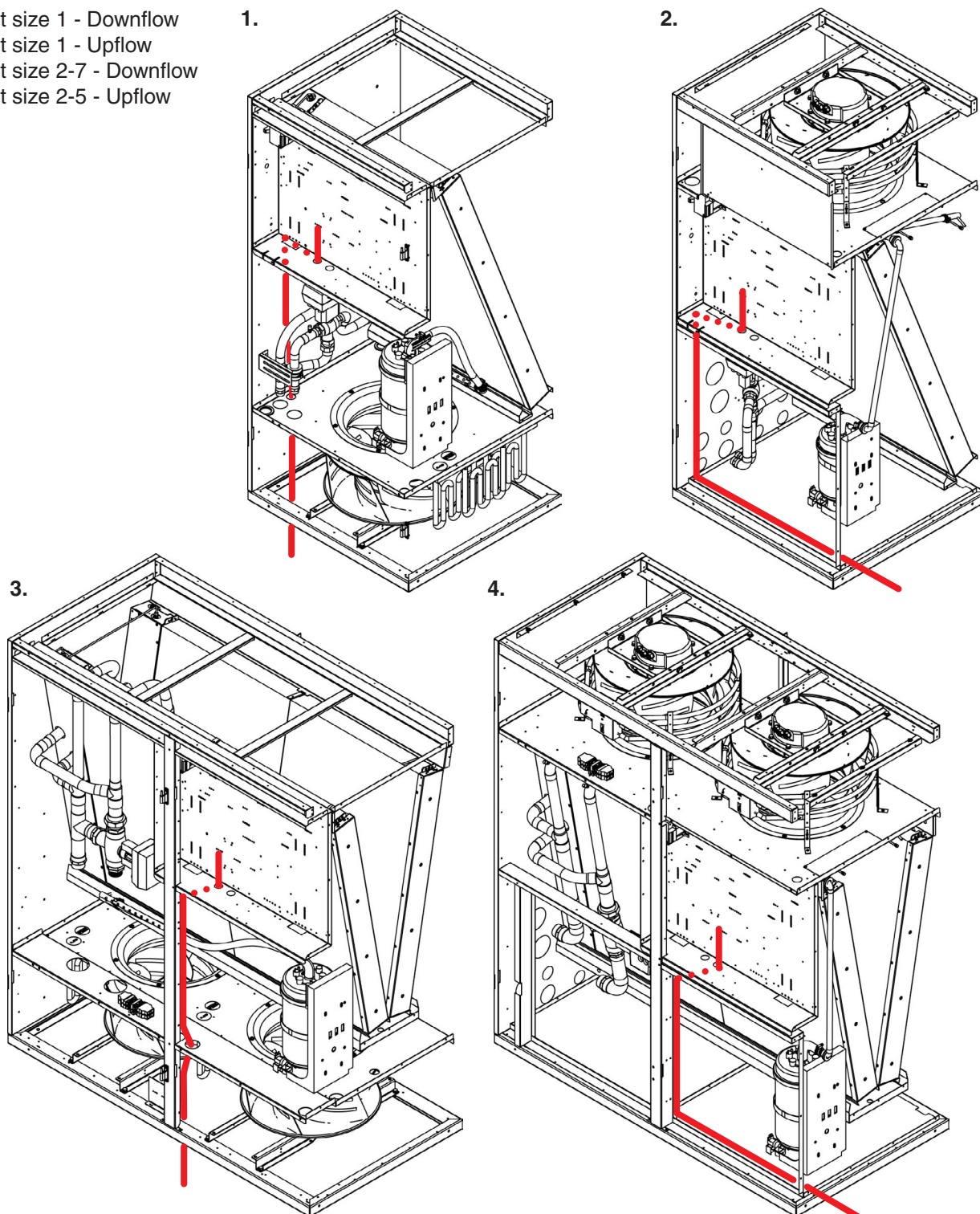
For use of leakage-current (FI) circuit breakers, EN 50178 5.2.11.2 must be taken into account. Only type B pulse-current FI circuit breakers are permitted. FI circuit breakers do not provide protection against bodily harm during operation of the unit or frequency converters.

Make sure that the power supply corresponds to the indications on the rating plate and that the tolerances according to the "Application limits" are not exceeded.

In addition to this, the **asymmetry of phase** between the conductors may amount to **2% maximally**. The asymmetry of phase is determined by measuring the voltage difference between the phase conductors. The average value of the voltage differences may not exceed 8 V.

## Insertion of the power supply cable

1. cabinet size 1 - Downflow
2. cabinet size 1 - Upflow
3. cabinet size 2-7 - Downflow
4. cabinet size 2-5 - Upflow



### System with external pump

Choose a power switch and a contactor in respect of the pump capacity. A power switch and a contactor can be located in the electric box.



**Caution!** The power supply of the pump can not be obtained via the master switch as the master switch is designed according to the current consumption of the standard unit. The pump must be individually provided with safety elements.

Design the wiring between the controller and the contactor with reference to the connection diagram for the controller and the wiring between the pump and power switch according to the manufacturer's notes.

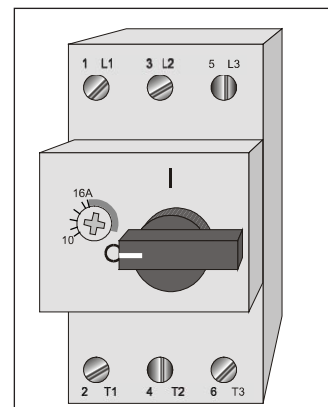


## 7. Commissioning



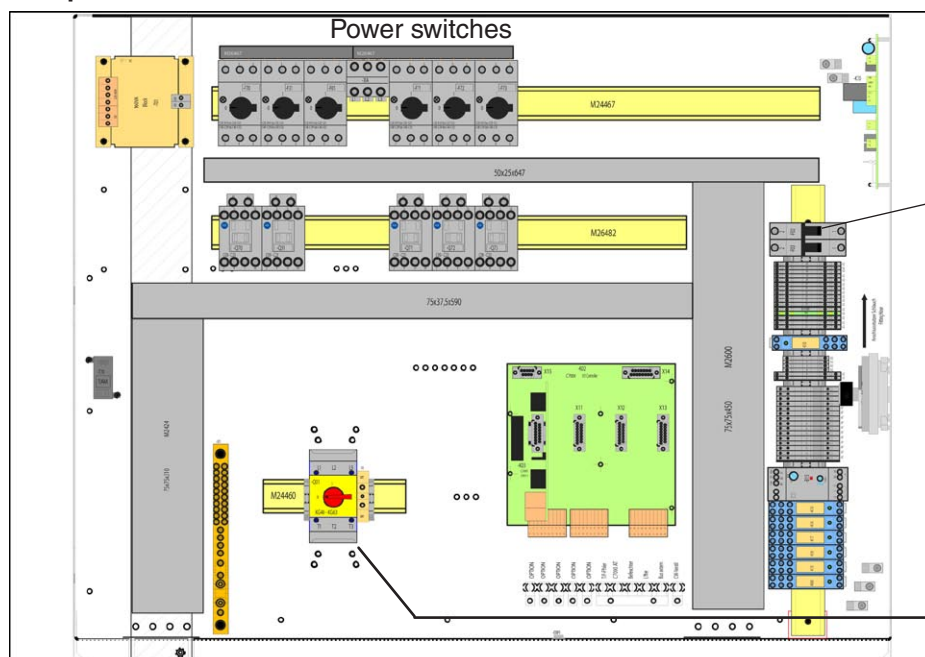
The unit must be installed and connected in accordance with the chapter on "installation" before initial commissioning.

- Make sure that the master switch is off and the unit is de-energized.
- Open the electrical compartment door of the unit using the key provided.
- Check whether all power switches and control-circuit fuses in the electrical section of the unit are switched off.
- Retighten all screw connections in the electric cabinet.
- Verify the smooth function of the contactors.



Power switch off

### Electrical compartment



Control-circuit fuses

Master switch



Do not turn the adjustment screw beyond the end of the calibrated scale range, as it may result in overheating and short-circuit at the consumer or in the destruction of the power switch.

- Adjustment of the power switches according to electrical data sheet.
- Switch on the A/C unit at the master switch.
- Switch on the control-circuit fuses and the power switch of the fan in sequence.

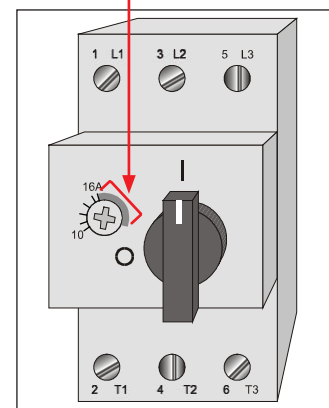
The controller is now supplied with power, so you can use it for adjustments.

Make sure that the heat rejecting system (chiller) is operating.

- Close all doors of the A/C unit.
- Adjust the desired return air temperature at the controller.
- Start the A/C unit by pressing the Start/Stop-key on the controller.
- Instruct the operational staff of the controller manipulation (refer to the controller manual).

The doors can only be opened with the key provided and represent a protective device. During operation the doors may not be opened and the rear panels may not be removed.

non-calibrated range



Switching on power switch

## 8. Maintenance

### 8.1 Safety instructions

All maintenance work is to be carried out under strict compliance with the country-specific accident prevention regulations. In particular we refer to the accident prevention regulations for electrical installations, refrigerating machines and equipment. Non-compliance with the safety instructions can endanger people and the environment. Maintenance work is only to be carried out on the units by authorized and qualified specialist staff.

#### Procedure instructions

Work on the system must always only be carried out when it is shut down. To do this, the unit must be switched off at the controller and at the master switch. A „DO NOT SWITCH ON“ warning sign must be displayed.



Live electrical components are to be switched to de-energized and checked to ensure that they are in the de-energized state.

Some verifications must be effected with the unit in operation (measuring the current, pressures, temperatures). In such a case the unit must only be switched on at the master switch after all mechanical connections have been carried out. The unit must be switched off immediately after the measuring procedure.

#### Warning notes!

**When the master switch is switched on and the controller is stopped the power contactors are live, even if the components are not operating.**

**At the fan contactor, dangerous voltages occur. Do not open the unit within the first 5 minutes after disconnection of all phases. Be sure that the unit is being isolated.**

**In units with 2 or 3 fans dangerous charges of >50μC can occur between AC line terminals and PE after disconnection.**

**The electronics housing can get hot.**

**The fans have an operation delay after the unit is stopped ! (Risk of injury)**

### 8.2 Maintenance intervals

Component	Maintenance interval			
	monthly	quarterly	half-yearly	yearly
<b>Air circuit</b>				
Heat exchanger		x		
Fan				
Air filter		x		x
<b>Water circuit</b>				
Tightness	x			
<b>Unit in general</b>				
Electrics				x
Mechanics				x

## 8.3 Air circuit

### Heat exchanger (CW-coil)

The heat exchanger consists of copper tubes with aluminium fins. If refrigerant leaks occur, they should be searched for at the heat exchanger. Beyond that, the heat exchanger is exposed to the air pollution, the particles of which settle at the fins and reduce the heat transmission the same as raise the air resistance. The latter shows when the fan current increases.

The heat exchanger can be cleaned by pressurized air which has to be blown opposite to the normal air flow direction along the fins.



**Do not distort the fins while cleaning, this also increases the air resistance !**

### Fan

The bearings of the fans are lifetime lubricated and do not need maintenance. Check the operation current. An increased operation current indicates either a higher air resistance by a clogged pre-filter or a winding short circuit in the fan motor.

The fans are speed controlled in dependance of the required cooling capacity. You can manually modify the speed at the controller for test purposes, so as to compare the measured current with the values on the pages with the technical data or with those of the planning tool.

### Air filter

A filter monitor controls the state of the filter. As soon as the pressure loss exceeds an adjustable value, a filter alarm via the controller is released. The controller can be configured such as to compensate the pressure loss by a higher fan speed, however you should not wait too long for exchanging the filter. The filters can be accessed by the front doors, depending on the cabinet size the number of filter elements varies.

The clogged filter elements can not be cleaned with pressurized air, as the filter structure would be destroyed otherwise. When you re-install the filter elements after the exchange, take care that the side with the coloured mark (dirt side) is turned away from the heat exchanger.

## 8.4 Water circuit

### Tightness

Check the water circuit visually for tightness. Beyond that a level indication at the storage tank, if existant, can give information about changes of the water quantity. A lack of water in the circuit is replaced by air, which reduces the heat capacity of the chilled water circuit and is detrimental to the pump.

## 8.5 Unit in general

### Electrics

Check the connection terminals for tight fixation when the unit is installed and once again after an operation time of 30 days.

### Mechanics

Clean the unit's inside with a vacuum cleaner. Clean pipes simplify the search for leaks. Check the pipes for a tight seat. Vibrations of pipes and circuit components can result in leaks. Check also the insulation of the water piping. Condensing air humidity on cold water pipes means a loss of cooling capacity.



## 9. Malfunction

Alarm message	Cause for alarm	Cause	Elimination
C7000: Airflow failure C1002: FLO#	Differential pressure for air-flow switch has triggered.	1. Fan motor defective. Fan speed too low. 2. Air filter extremely clogged. 3. V-belt worn. 4. Hoses to the airflow monitor dirty or kinked.	Check fan motor on voltage continuity and current consumption. Fan mechanically blocked? Check air filter. Exchange V-belt. Clean hoses and check whether they are kinked .
C7000: Sensor # error C1002: not existant	The tolerance to the average value adjustable in the controller has been exceeded.	1. Big difference of measeured values in selected zone. 2. sensor defective.	Check room on Hotspots or chilled air zones, moist zones. Check measured value with an external measuring instrument.
C7000: Sensor # defective C1002: SE t or SE h	The measured voltage/current is outside the range defined in the controller. C1002: temperature: <3°C or >50°C humidity: <3% or >97% r.h.	1. electrical connection defective. 2. sensor cable defective. 3. sensor defective.	Check connections. Check cable on continuity. Check measured value with external thermometer, hygrostat, pressure gauge.

Depending on the option configured in the controller further alarm messages exist.  
 # stands for a number in case of several components of the same kind.

## 10. Dismantling and disposal

The A/C unit can only be dismantled by qualified specialists.

Switch off the A/C unit at the controller and at the master switch. Switch off power conducting cables to the unit and secure them against being switched on again. Disconnect the A/C unit from the de-energized network.



**If glycol or similar additives had been used, this liquid has to be collected and disposed in an appropriate manner and may under no circumstances be introduced in the local waste water system.**

Disconnect the unit from the external water circuit by closing the shut-off valves and drain the water circuit of the unit.

Disconnect the depressurized cooling water pipes of the unit from the external system.

Move the unit, as described in the chapter "transport", with a lifting device of sufficient load-carrying capacity.

Dispose of the A/C unit in accordance with the disposal and safety regulations applicable on site. We recommend a recycling company for this. The unit basically contains the raw materials aluminium (heat exchanger), copper (pipes, wiring), and iron (panelling, mounting panel).

# 11. Contents of the CE Declaration of Conformity

The undersigned

**STULZ GmbH  
Klimatechnik  
Holsteiner Chaussee 283  
22457 Hamburg**

hereby confirms that the units listed below, in the version marketed by us, fulfil the requirements of the harmonised EC directives and EC safety standards listed below.

In the case of a modification of the equipment not co-ordinated with us this declaration loses its validity.

## Air conditioning unit

### Cyber Air 3 ... CW

ASD 320 ...	/	ASU 320 ...
ASD 420 ...	/	ASU 420 ...
ASD 550 ...	/	ASU 550 ...
ASD 650 ...	/	ASU 650 ...
ASD 800 ...	/	ASU 800 ...
ASD 950 ...	/	ASU 950 ...
ASD 1000 ...	/	ASU 1000 ...
ASD 1180 ...	/	ASU 1180 ...
ASD 1250 ...	/	ASU 1250 ...
ASD 1550 ...	/	ASU 1550 ...
ASD 1800 ...		
ASD 2100 ...		

### Cyber Air 3 ... CW2

ASD 270 ...	/	ASU 270 ...
ASD 510 ...	/	ASU 510 ...
ASD 670 ...	/	ASU 670 ...
ASD 810 ...	/	ASU 810 ...
ASD 1070 ...	/	ASU 1070 ...
ASD 1170 ...		

## EC-Directives

EC machinery directive 2006/42/EC  
EC directive for low voltage 2006/95/EC  
EC EMC directive 2004/108/EC  
EC pressure equipment directive 97/23/EC

## Harmonised EN

EN ISO 12100 -1/2  
EN ISO 13857  
EN 60204 -1  
EN 61000-6-2  
EN 61000-6-4

## National regulation

BGV A3  
BGV D4

Hamburg, 01.09.2011

Place, date

ppa.

Works management: Mr. Panknin



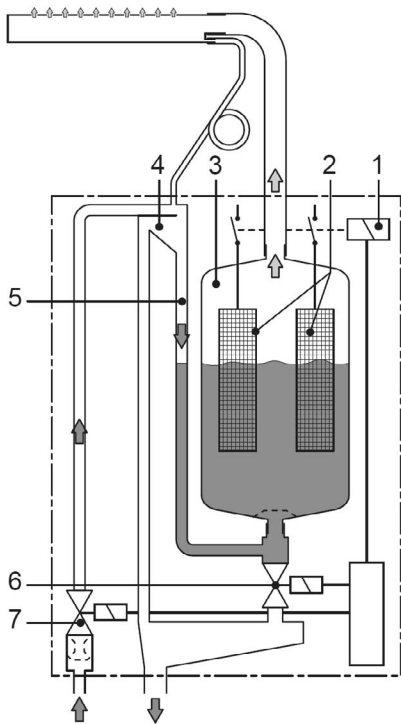


## 12.1 Steam humidifier

The steam humidifier is an optional extra for your A/C unit. It is installed complete and integrated within the function and method of operation of the A/C unit. Details concerning the connection assignment for the power supply can be found in the electrical diagrams in the appendix.

### 12.1.1 Description

The steam humidifier OEM2 is a pressureless steam generator that utilizes an electrode heating and is designed for air humidification via a steam distributor (steam distribution pipe, steam nozzle).



#### Steam generation

Any time steam is requested, the electrodes (2) are supplied with voltage via main contactor (1). Simultaneously, the inlet valve (7) opens and water enters the steam cylinder (3) from the bottom via water cup (4) and supply line (5). As soon as the electrodes come in contact with the water, current begins to flow between the electrodes, eventually heating and evaporating the water. The more the electrode surface is exposed to water, the higher is the current consumption and thus the steam capacity.

Upon reaching the requested steam capacity, the inlet valve closes. If the steam generation decreases below a certain percentage of the required capacity, due to lowering of the water level (e.g. because of the evaporation process or drainage), the inlet valve opens until the required capacity is available again.

If the required steam capacity is lower than the actual output, the inlet valve is closed until the desired capacity is achieved by lowering of the water level (evaporation process).

#### Level monitoring

A sensor provided in the steam cylinder cover detects when the water level gets too high. The moment the sensor comes in contact with water, the inlet valve closes.

#### Drainage

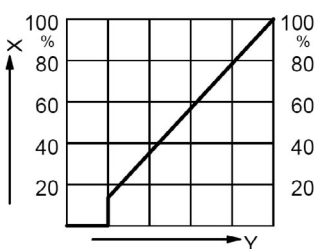
As a result of the evaporation process, the conductivity of the water increases due to an escalating mineral concentration. Eventually, an inadmissibly high current consumption would take place if this concentration process were permitted to continue. To prevent this concentration from reaching a value, unsuitably high for the operation, a certain amount of water is periodically drained from the cylinder and replaced by fresh water.

During the drainage process, the drain valve (6) is opened. Following a pre-determined time of drainage, the drain valve is closed again.

#### On/Off control



#### Proportional control



X = steam capacity in %  
Y = Output signal controller

#### Control

With the ECCM/S control unit either On/Off control or proportional control can be employed for steam production.

Below a minimum controllable steam output, proportional control will work in two-point operation (on/off control).

## Danger that may arise from the unit



### **DANGER! Danger of electric hazard!**

The steam humidifier OEM2 is operated with mains voltage. One may get in touch with live parts when the unit is open. Touching live parts may cause severe injury or danger to life.

**Prevention:** Before carrying out any work set the steam humidifier OEM2 out of operation as described in chapter 12.1.3.5 (switch off the unit, disconnect it from the mains and stop the water supply) and secure the unit against inadvertent power-up.



### **WARNING! Danger of burning!**

The steam humidifier OEM2 produces steam. When producing steam, the steam cylinder inside the humidifier gets very hot (up to 100 °C). If the unit is opened immediately after having produced steam there is danger of burning when touching the steam cylinder.

**Prevention:** Before carrying out any work set the steam humidifier OEM2 out of operation as described in chapter 12.1.3.5, then wait until the steam cylinder has cooled down sufficiently thus preventing danger of burning.

## 12.1.1.1 Technical data

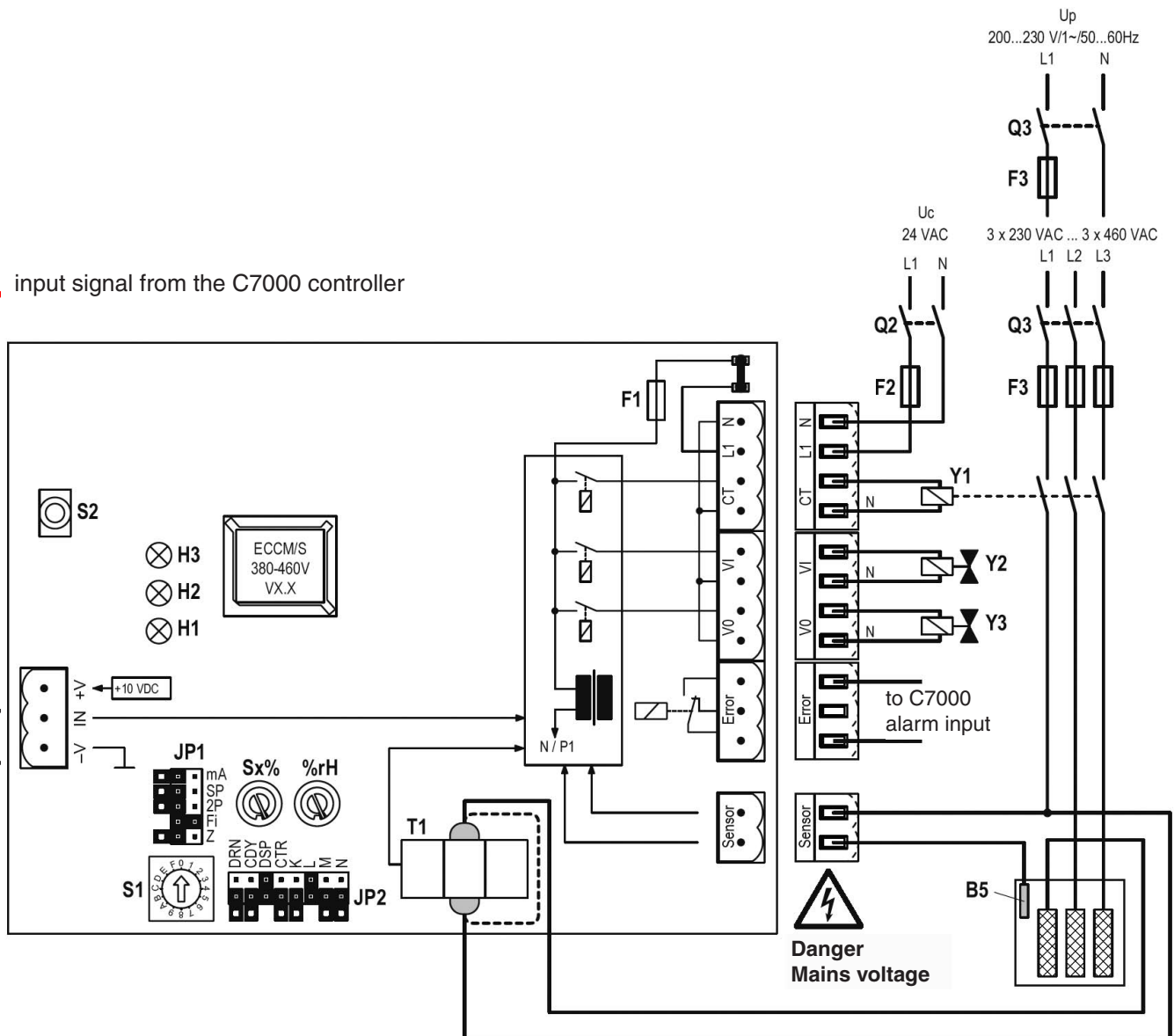
Steam capacity [kg/h]	Nominal power [kW]	Nominal current [A]	Max. current [A]
200 ... 230V / 1N~ / 50 ... 60Hz			
2,0	1,5	7,5 ... 6,5	9,4 ... 8,2
4,0	3,0	15,0 ... 13,0	18,8 ... 16,3
200 ... 230V / 3~ / 50 ... 60Hz			
4,0	3,0	8,7 ... 7,5	10,8 ... 9,4
8,0	6,0	17,3 ... 15,1	21,7 ... 18,8
10,0	7,5	21,7 ... 18,8	27,1 ... 23,5
380 ... 460V / 3~ / 50 ... 60Hz			
4,0	3,0	4,6 ... 3,8	5,7 ... 4,7
8,0	6,0	9,1 ... 7,5	11,4 ... 9,4
15,0	11,25	17,1 ... 14,1	21,4 ... 17,6

### Operating conditions

Admissible water pressure	1 ... 10 bar
Water quality	Drinking water with a conductivity of 125 - 1250µS/cm
Admissible water temperature	1 ... 40 °C
Admissible ambient temperature	1 ... 50 °C (control unit 1 ... 40 °C)
Admissible ambient humidity	max. 75% rh, non-condensing
Adm. back pressure at steam connection	- 0,5 kPa ... 1,0 kPa
Type of protection	IP00
Conformity	produced according VDE regulations 0700 and 0700 part 98

### 12.1.1.2 Wiring diagram of the control unit ECCM/S

input signal from the C7000 controller



- B5 Level sensor steam cylinder
- F1 Fuse control board (2 A, time-lag)
- F2/Q2 Automatic fuse control voltage
- F3/Q3 MCB humidifier
- H1 Red LED: Error
- H2 Yellow LED: Service, Warning
- H3 Green LED: Steam production
- JP1 Jumper block 1
- JP2 Jumper block 2

- S1 Rotary switch unit type
- S2 Drain/Info key
- Sx% Potentiometer power limitation
- %rH Potentiometer humidity value
- Y1 Main contactor heating voltage
- Y2 Inlet valve
- Y3 Drain valve
- T1 Current sensor

### 12.1.1.3 Configuration of the control unit ECCM/S

#### Setting the capacity limitation "Sx%"

Use the potentiometer "Sx%" to set the capacity limitation in % of the maximum capacity (setting range: 25...100%, factory setting: 100%).

#### Setting the control signal

With the jumpers on jumper block "JP1" you can set the control signal. The control signal is adjusted on 0-10V, none of the jumpers "mA", "SP", "2P" on jumper block "JP1" may be set for this.

#### General unit settings

With the jumpers on the jumper blocks "JP1" and "JP2" you can set different unit parameters.

Pos.	with jumper	without jumper
<b>Fi</b>	Connection to a mains supply with ground fault circuit interrupter **	Connection to a mains supply without ground fault circuit interrupter
<b>DRN</b>	Increased drain operation factor	Regular drain operation factor **
<b>CDY</b>	Low water conductivity (<125 µS/cm)	Normal water conductivity (≥125 µS/cm) **
<b>DSP</b>	Exchangeable steam cylinder **	Cleanable steam cylinder
<b>K</b>	Fault No. 4 "steam cylinder maintenance due": the unit triggers a warning only (the error switch on the control unit ECCM/S is not activated).	Fault No. 4 "steam cylinder maintenance due": 72 hours after the warning an error is triggered and the unit is switched off (red LED lights). However, the error switch on the control unit ECCM/S is activated already in warning status. **
<b>L</b>	Fault No. 3 "Fill time": a warning is triggered after 20 minutes filling time exceeding. After 220 minutes filling time exceeding an error is triggered and the unit is switched off (red LED lights and the error switch on the control unit ECCM/S is activated). **	Fault No. 3 "Fill time": the unit directly triggers an error after 20 minutes filling time exceeding (red LED lights and the error switch on the control unit ECCM/S is activated). However, the unit is switched off after 220 minutes filling time exceeding.
<b>Z, M, N</b>	no function (spare)	

\*\* Factory settings



### 12.1.2 Supply connections

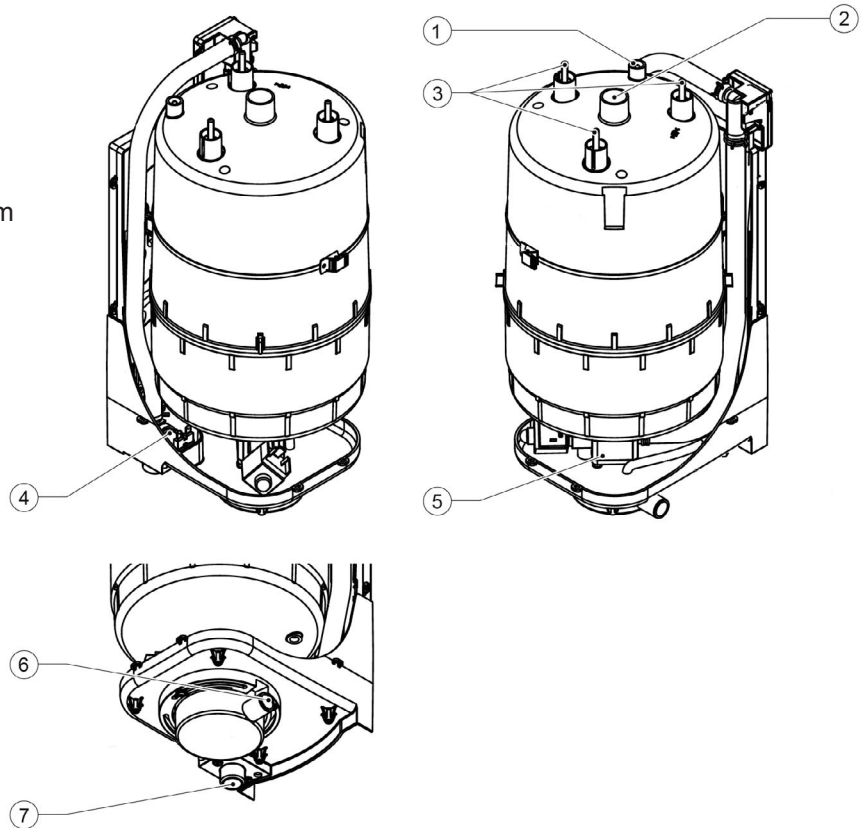
The steam humidifier is installed and electrically connected in the A/C unit. The local regulations of the water supply company are to be complied with when making the hydraulic connection.



**We recommend the installation of an Aqua-stop valve in the water supply of the humidifier. In addition to this, the room, in which the A/C unit with the humidifier is installed, should be equipped with a water detection system.**

#### Legend:

- 1 Level sensor
- 2 Steam outlet connector  $\varnothing 22.5 - 30$  mm
- 3 Heating electrodes
- 4 Inlet valve
- 5 Outlet valve
- 6 Drain connector  $\varnothing 22.1$  mm
- 7 Water supply connector G 3/4"



#### Water supply

The water connection is made from the cold water mains and is to be equipped with a shut-off valve. It is recommended to install a filter to retain solid particles of pollution. The humidifier can be connected directly to the mains by a threaded tenon of 3/4" when the water pressure is between 1 and 10 bar. The pipe should have a diameter of at least 6 mm. In the factory a 680 mm hose with 3/4 inch nut on each side is mounted to simplify the connection to the piping on site.

If the line pressure is more than 10 bar, the connection must be made via a pressure reducing valve (set to 4-6 bar). In each case it is to be ensured that the manufactured water pipe upstream of the connection to the humidifier is flushed properly. We recommend only using copper pipes. The water supply temperature must not exceed 40°C.

#### Water drain

The drain connection has an outside diameter of 22.1 mm. A plastic hose can be connected to the drain connection which can be routed out of the unit by means of the openings in the unit provided for this purpose.

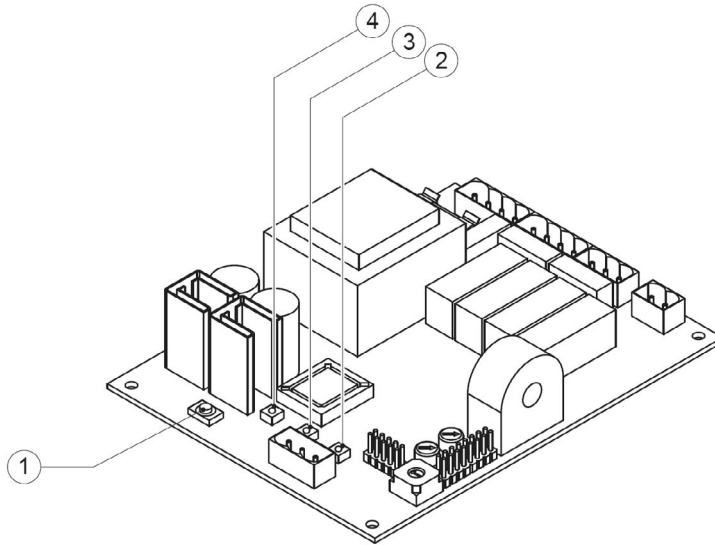
When creating the drain, attention is to be paid to provision for cleaning.

As the water drain is depressurized, we recommend routing the drain hose first into an open collector funnel and then passing through a syphon to the drainage system to ensure free discharge.

The drainage pipe should be routed to the sewerage system with sufficient gradient (at least 5%) and should be located approx. 30 cm below the humidifier. Attention is to be paid to temperature resistance when plastic pipes are used. If copper pipe is used, it must be earthed. For the drainage pipe an inside diameter of at least 22 mm is required.

## 12.1.3 Operation

### 12.1.3.1 Function of the display and operating elements on the control unit ECCM/S



#### 1 Drain/Info key

- press key shortly: opens and closes the drain valve (manual draining).  
**Note:** the drain valve is automatically closed after 10 minutes.
- press key for a extended period of time: activating the info mode

#### 2 Error indication (red LED)

- in normal operating mode  
 The LED lights in case of a malfunction of the unit. Further operation is no longer possible, the heating voltage is interrupted. An alarm signal is sent to the C7000 controller. At the C7000AT the alarm "HUMIDIFIER 1 FAILURE" is displayed.
- in info mode  
 LED blinks in intervals if a malfunction is present. The number of "blinks" per interval indicates the number of the error (see chapter 12.1.4.3).

#### 3 Warning and info indication (yellow LED)

- in normal operating mode
- The LED blinks, if manual draining is in progress.
- The LED lights if the cylinder maintenance is due or the maintenance indication is not reset after the maintenance.
- in info mode  
 LED blinks in intervals if a malfunction with status warning is present. The number of "blinks" per interval indicates the number of the error (see chapter 12.1.4.3).

#### 4 Steam production (green LED)

- in normal operating mode  
 The LED lights if the unit produces steam.
- in info mode  
 LED blinks in intervals. The number of "blinks" per interval multiplied by 10 indicates the current steam output in % (see chapter 12.1.3.3).

### 12.1.3.2 Commissioning

Proceed as follows when putting the unit into operation:

1. Examine the steam humidifier and installation for possible damage.
2. Open the shut-off valve (if existant) in the water supply line.
3. Switch on control fuse and humidifier power switch in electric box. Switch on main switch.
4. Adjust the humidity set value at the C7000 controller. To force humidifer operation for a functional test you can either increase the set value or start the humidifier by the manual operation function of the C7000.

After switching on the control unit ECCM/S carries out a system test, during which all the LEDs on the control unit light up in sequence.

If, after the system test (or during operation) the yellow or red LED lights up, an error has occurred (see information in chapter 12.1.4 "Fault elimination").

After switching on the steam humidifier is ready for operation. As soon as the C7000 controller requires humidity, power is switched on and the green LED lights on the control unit ECCM/S. The inlet valve opens after approx. 60 seconds and the steam cylinder fills with water. The submerged electrodes heat the water up and after a few minutes (approx. 5–10 minutes, depending on the conductivity of the water) steam is produced.

**Note:** If the water has low conductivity, it is possible in the first few hours of operation that the maximum steam output is not achieved. This is normal. As soon as the water reaches adequate conductivity through the vaporization process, the steam humidifier will work at maximum output.

### 12.1.3.3 Function of the LEDs in info mode

The info mode is activated by pressing the drain/info key for an extended period of time (> 3 seconds). In info mode the LED's on the control unit indicate the current operating status of the steam humidifier.

**Note:** The info mode is automatically reset after 15 minutes, or manually by pressing the drain/info key again.

- the green LED blinks. The number of blinks indicates the current steam output in % of the maximum steam capacity:

green LED blinks...	1x	2x	3x	4x	5x	6x	7x	8x	9x	10x
Steam capacity in %	10	20	30	40	50	60	70	80	90	100

### 12.1.3.4 Manual draining

1. Briefly press the drain/info key. The heating voltage is interrupted and the drain valve opens. The yellow LED blinks.

Note: the drain valve closes after 10 minutes automatically

2. To stop the drain cycle briefly press the drain/info key again.

### 12.1.3.5 Taking the unit out of operation

1. If the unit has to be switched off because of a malfunction, please activate the info mode (see chapter 4.4.1) and note the number (number of blinks of the red LED) of the actual error.
2. Close the shut-off valve in the water supply line.
3. Start manual draining and wait until the steam cylinder is empty (approx. 5-10 minutes).
4. Disconnect the steam humidifier from the mains: Switch off the humidifier power switch in the electric box.

### 12.1.4 Fault elimination

**Important!** Most operational malfunctions are not caused by faulty equipment but rather by improper installation or disregarding of planning guidelines. Therefore, a complete fault diagnosis always involves a thorough examination of the entire system. Often, the steam hose connection has not been properly executed, or the fault lies with the humidity control system.

#### 12.1.4.1 Fault indication

LED on control unit ECCM/S		Description
yellow	red	
blinks permanently	—	Drain/info key has been pressed shortly (manual draining in progress)
lights	—	Steam cylinder maintenance due or maintenance indication not reset.
lights	lights	Steam cylinder maintenance not executed or maintenance indication not reset.
—	lights	Fatal malfunction.

If the yellow or red LED lights, press drain/info key (at least 3 seconds) until yellow (“Warning”) or red (“Error”) LED starts blinking intermittently (info mode). The amount of “blinks” per interval indicates the type of malfunction.

– Yellow LED “Warning” blinks intermittently

A malfunction is present. The control unit checks whether there is a temporary problem (e.g. water supply interrupted for a short time) or whether it can resolve the problem by taking necessary measures.

– Red LED “Error” blinks intermittently

The control unit, after several attempts, fails to solve the problem (number of attempts depends on the type of malfunction) or the problem obstructs further operation. In this case the heating voltage is interrupted via the main contactor.

#### 12.1.4.2 Notes on fault elimination



**DANGER! Danger of electric hazard!**

For the elimination of faults set the steam humidifier out of operation as described in chapter 12.1.3.5, separate the unit from the mains (test with voltage tester) and secure it against inadvertent power-up.



**Do not touch electronical components, without taking care of protective ESD measures.**

### 12.1.4.3 Malfunction lists

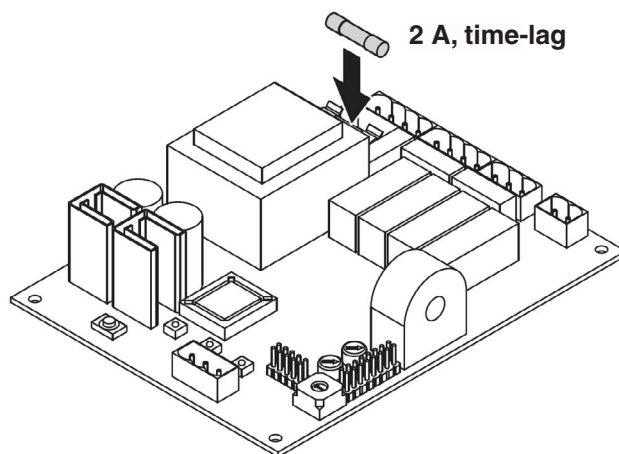
“Warning” yellow LED blinks	“Error” red LED blinks	Cause	Remedy
1x Control board defective	---	Control board defective	Please contact your unit supplier.
2x Max. filling level of steam cylinder reached	---	Water conductivity too low (after initial operation). Water conductivity too low for type of steam cylinder. Phase failure heating voltage.	Wait.  Select correct steam cylinder type. Check mains fuse(s) and replace if applicable.
3x Permissible filling time exceeded for more than 20 minutes (first automatic cleaning cycle)	3x Permissible filling time exceeded for more than 220 minutes.	Phase failure heating voltage.  Water supply obstructed, water pressure too low, inlet valve defective.  Excessive steam back pressure, causing water loss via filling cup. Drain valve is leaking.	Check mains fuse(s) and replace if applicable. Open shut-off valve in the water supply pipe, clean water inlet filter, check water pressure, inspect/replace inlet valve. Inspect steam installation.  Clean/replace drain valve.
<b>Note:</b> if the Jumper “L” is removed from the ECCM/S control unit, the unit automatically triggers an error without prior warning if the admissible filling time has been exceeded for more than 20 minutes (red LED lights and the error switch on the control unit ECCM/S is activated). However the unit switches off after 220 minutes of filling time exceeding (see chapter 12.1.1.3).			
4x Steam cylinder needs servicing	4x Interval for steam cylinder service exceeded for more than 72 hours	Interval for steam cylinder service exceeded. Mineral deposits and/or electrodes spent.	Replace steam cylinder type A, clean steam cylinder type D (see chapter 5, original instruction). <b>Important!</b> Refer to chapter 5.6 for resetting the maintenance indicator. (see chapter 5.6, original instr.).
<b>Note:</b> if the Jumper “K” is installed on the ECCM/S control unit, the unit remains in warning status even if the interval time has been exceeded for more than 72 hours. No error is triggered (red LED does not light) and the error switch on the control unit ECCM/S is not activated (see chapter 12.1.1.3).			
6x Electrode current too high	6x Electrode current too high	Steam cylinder (electrodes) defective. Faulty auto-drain function. Faulty drain valve/coil. Steam cylinder outlet obstructed. Water conductivity too high for type of steam cylinder.	Replace steam cylinder or electrodes. Inspect installation/control system. Replace drain valve/coil. Clean/replace steam cylinder. Select correct steam cylinder type.
7x Foam detection in the steam cylinder	7x Foam control impossible	Formation of foam in steam cylinder.	Empty/flush steam cylinder. Set jumper on “DRN” (see chapter 12.1.1.3).
---	8x Main contactor jammed	Main contactor jammed in activated position.	Check/replace main contactor.
9x Drain valve blocked	9x Drain valve blocked	Drain valve blocked or defective. Steam cylinder outlet blocked.	Clean/replace drain valve. Clean steam cylinder outlet.
---	10x Rotary switch in wrong position	Rotary switch on control unit ECCM/S is set to an invalid position.	Set rotary switch on control unit ECCM/S to the position for the corresponding steam cylinder type (see chapter 3.4.3, original instruction).

#### 12.1.4.4 Replacement of fine-wire fuse on the control unit ECCM/S

If the fine-wire fuse on the control unit ECCM/S blows this is usually due to a faulty coil of the inlet or drain valve or the main contactor. Therefore you should test these components before replacing the fuse.

To replace the fine-wire fuse proceed as follows:

1. Set the steam humidifier OEM2 out of operation as described in chapter 12.1.3.5, separate the unit from the mains and secure it against unintentional switching on. Take care that the electricity supply to the control unit ECCM/S is disconnected (check with voltage tester).
2. Replace fine-wire fuse (see figure below) with a fuse of the given type with the specified nominal current rating.



**CAUTION!**

It is not permitted to use repaired fuses or to short-circuit the fuse holder.

#### 12.1.4.5 Resetting fault indication (red LED lights in normal operating mode)

To reset the error indication:

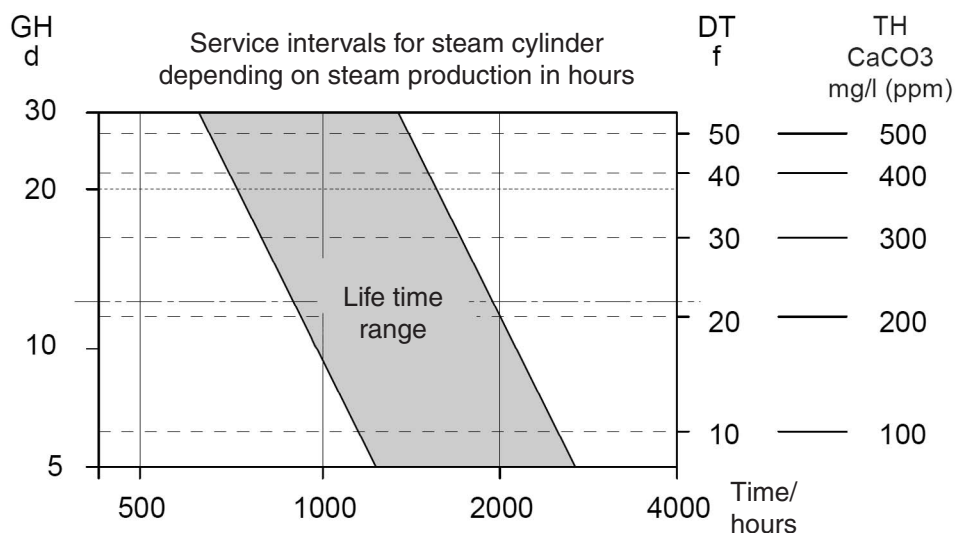
Disconnect the steam air humidifier from the mains. Wait approx. 5 seconds, then reconnect the unit to the mains.

**Note:** If the fault has not been eliminated, the error indication reappears after a short while.

### 12.1.5 Maintenance

You find a detailed description of the maintenance procedures in chapter 5 of the original instruction. Here you can only see a diagram, which shows the average life cycle of a steam cylinder in dependence of the runtime and the total hardness.

The humidifier runtime can be read in the Info menu of the C7000AT or by the command "humi h" in the C7000.



GH: Gesamthärte  
DT: Dureté totale  
TH: Total hardness

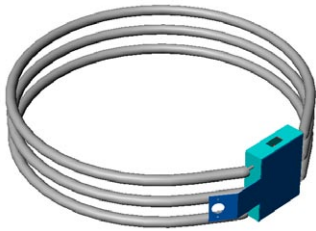
## 12.2 Reheat

The reheat is an optional extra for your A/C unit. It is installed complete and integrated in the function and method of operation of the A/C unit. It is used to heat up the air. The following versions of the heater are available:

- Electrical reheat
- Hot water reheat (HW)

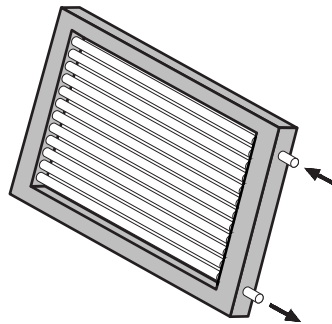
### Description

#### Electrical reheat



The reheat is connected in accordance with the electric diagram. It is controlled and monitored by the controller. The values for switching on and off are adjusted in the "operate/components/heating" menu on the controller. Refer to the operating instructions C7000.  
C1002: menu item 12-14 (E, F, H)  
C6000: Control/module functions/Heating/E-heating

#### HW reheat



The HW reheat is to be connected to an external hot water circuit. The water supply is controlled via an electrically actuated HW valve. The HW valve is controlled via the controller. The control parameters are adjusted in the "operate/components/heating/HWR valve" menu on the controller. Refer to the operating instructions C7000.

C1002: menu item 12-14 (E, F, H)  
C6000: Control/module functions/Heating/HWR-valve

### Operation

The reheat is controlled and monitored by the controller. No further measures are required for operation.

### Maintenance

Clean the reheat annually from contaminations and check it for damage.



## Installation

The reheats are installed and connected in the A/C unit. The HW reheat is to be connected on site to the external hot water circuit. The pipelines are to be routed out of the A/C unit. The thread sizes for the connection piping of the HW reheat are listed in the following table.

### Temperatures:

Water inlet: 60°C

Water outlet: 40°C

Air inlet: 13°C

Glycol: 0%

Cabinet size		1	2	3	4	5	7
Pipe - Ø	mm	16	22	22	22	28	28
Thread size	inch	1/2	3/4	3/4	3/4	1	1

## Commissioning

The reheats are controlled and monitored by the controller of your A/C unit. No further measures are required for commissioning.

## Malfunction causes

### Alarm: Reheat defect

All reheat alarms are received by the controller and can be requested according to the equipment.

C7000-control system: no display (display only externally)

C7000 advanced terminal: indication on the display

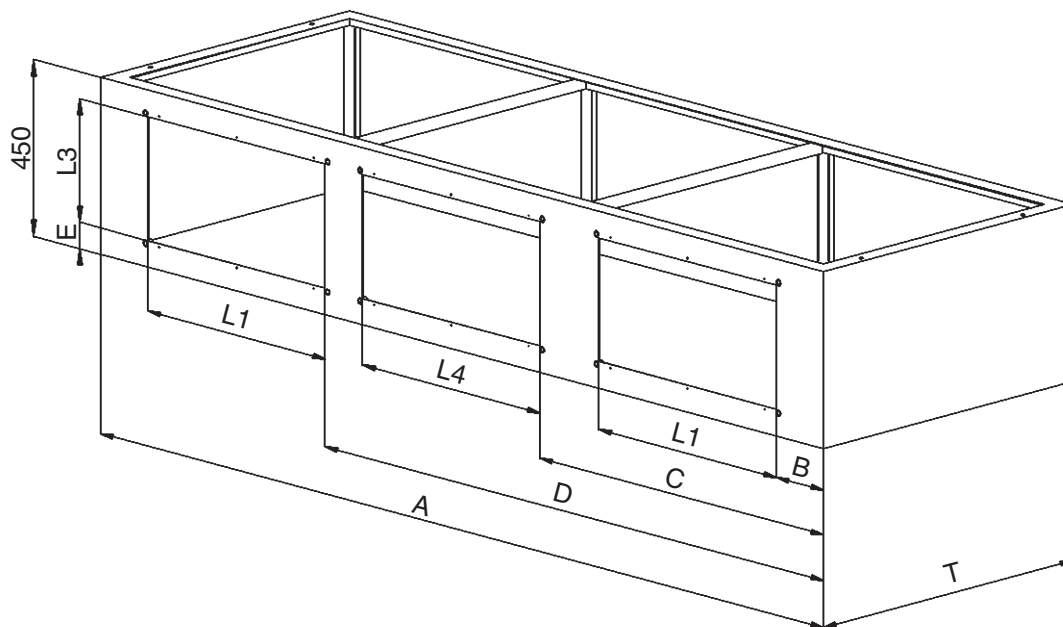
C1002: display: HEA



## 12.3 Air side connection

### 12.3.1 Unit base

The unit base is available in the versions: open, with damper, with flexible connection or with supply grilles. The unit base can be installed in two ways, with the opening to the front or with the opening to the rear.



Cabinet size		1	2	3	4	5	7
A	mm	910	1360	1710	2160	2510	3070
B	mm	130/47,5*	210	182	69	173	42,5/65*
C	mm	-	-	-	-	993	-/1027,5*
D	mm	-	-	927	1276	1738	1727,5/2190*
E	mm	75/67,5*	68	68	67,5	68	52,5/67,5*
L1	mm	700/815*	1015	615	815	615	1300/815*
L2	mm	700/800*	1000	600	800	600	1300/800*
L3	mm	300/315*	315	315	315	315	345/315*
L4	mm	-	-	-	-	615	1015*
L5	mm	-	-	-	-	600	1000
T	mm	865	865	865	865	865	955
N°		1/1*	1/1*	2/2*	2/2*	3/3*	2/3*

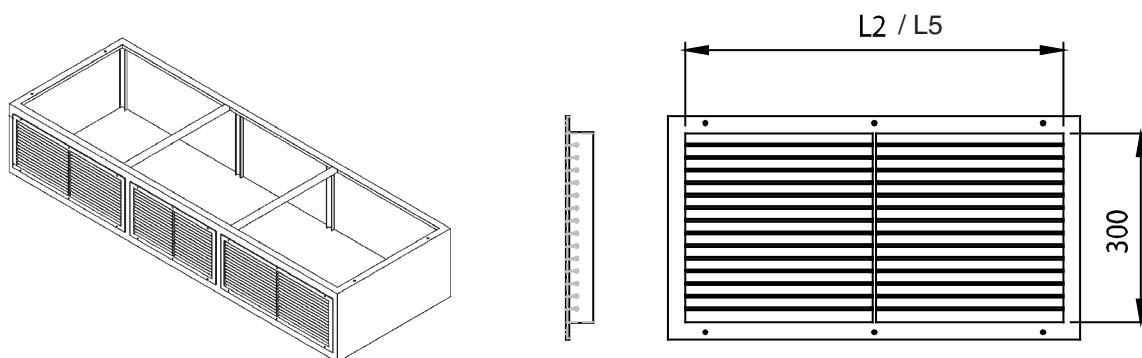
\*version with grilles

N°: Number of openings



**Caution! Each of the unit base versions must be screwed to the unit by 4x M10 screws!**

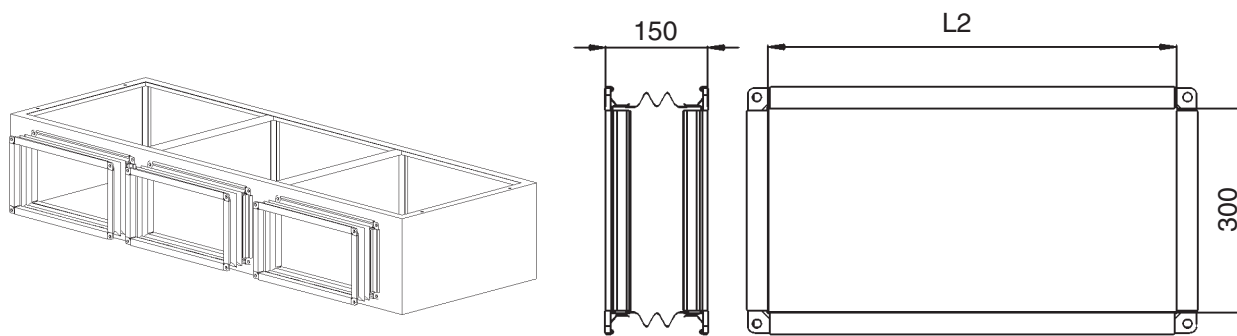
### Unit base with grilles



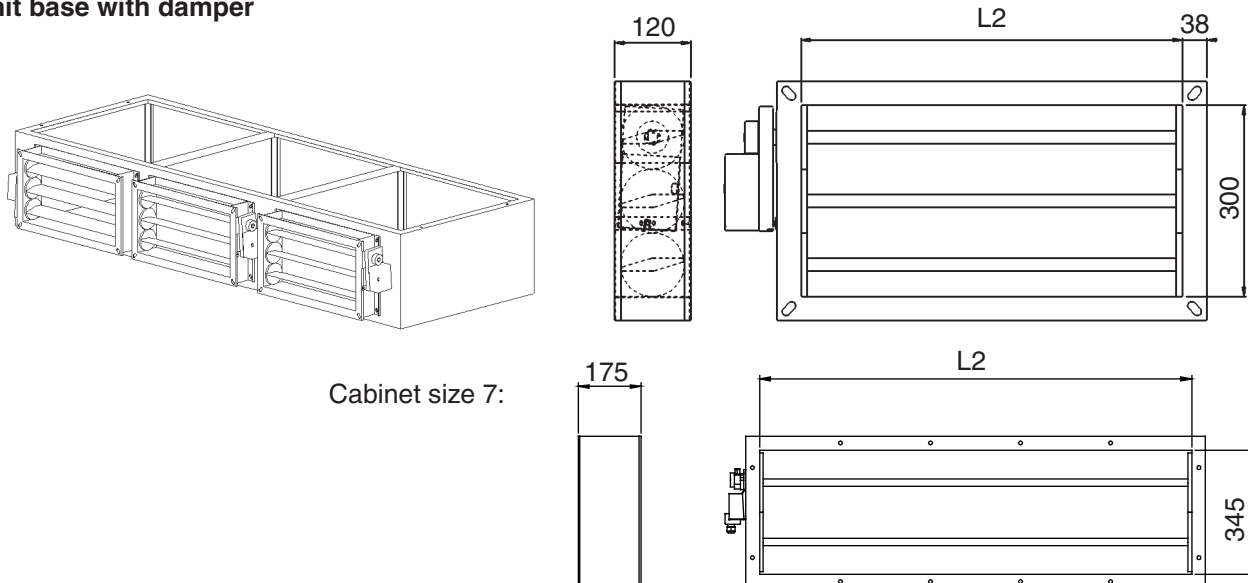
The standard grilles are equipped with horizontal fins which can be adjusted to conduct the air which is blown out.

L5: middle position for size 5 and 7

### Unit base with flexible connection



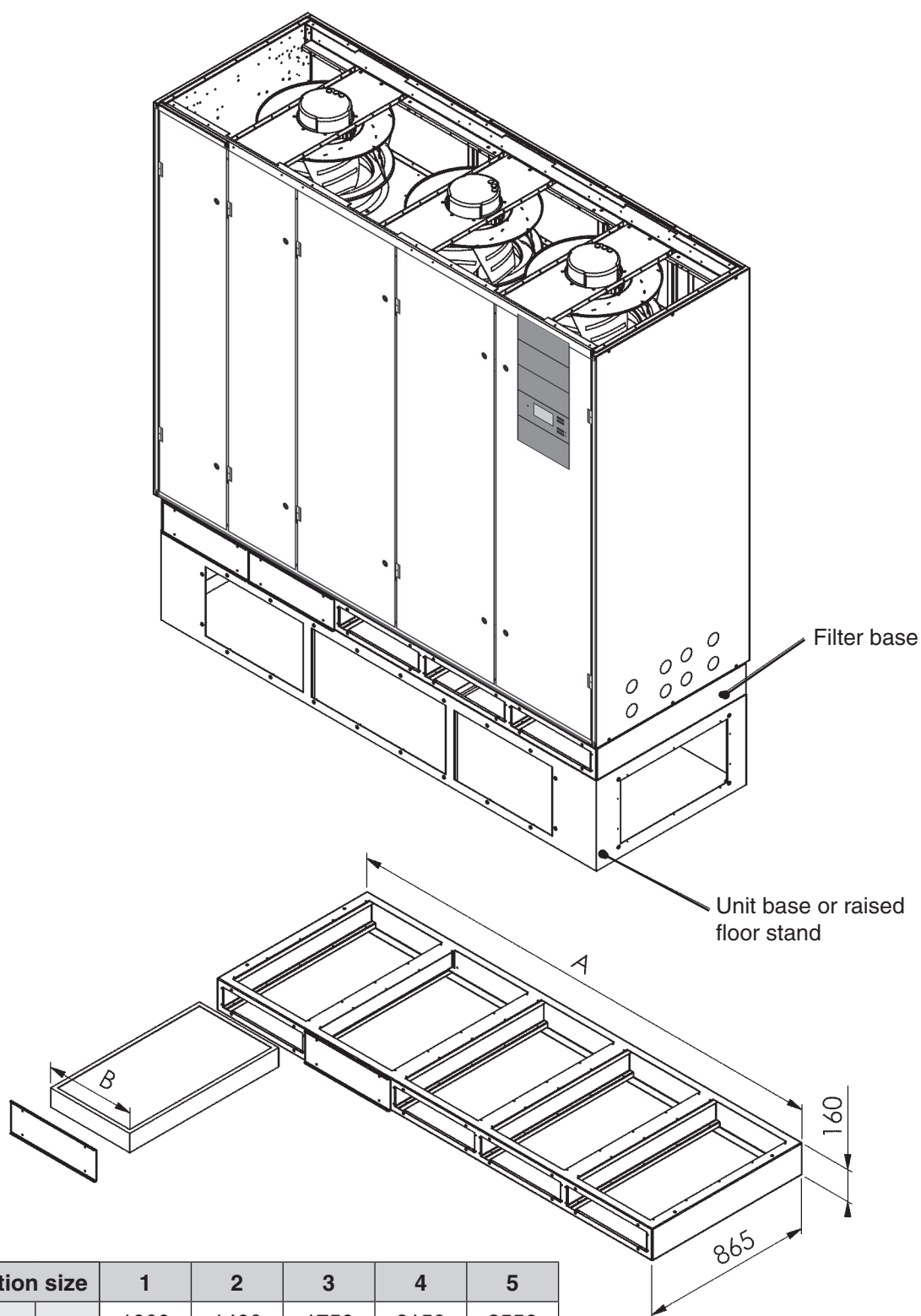
### Unit base with damper



**Caution! Each of the unit base versions must be screwed to the unit by 4x M10 screws!**

### 12.3.2 Filter base

The filter base is designed for the option "suction from bottom". With this option for upflow units the front panels are not provided with an air inlet perforation as otherwise usual. The air is drawn in from the bottom, in consequence there is no unit bottom plate, but supporting bars instead, on which compressors and other components are mounted.

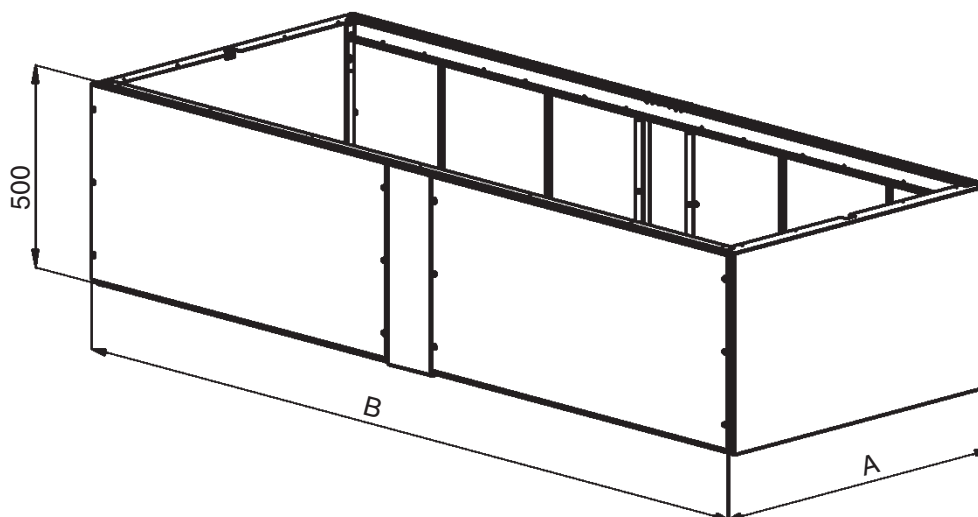


Construction size		1	2	3	4	5
unit width	mm	1000	1400	1750	2150	2550
A	mm	960	1360	1710	2110	2510
B	mm	270	293	376	376	456
N° of filters	mm	3	4		5	

For the air side connection on **top of the unit** exist different options, which are delivered in a completely assembled condition. On the installation site these set-ups must be set upon the unit and must be connected to it.

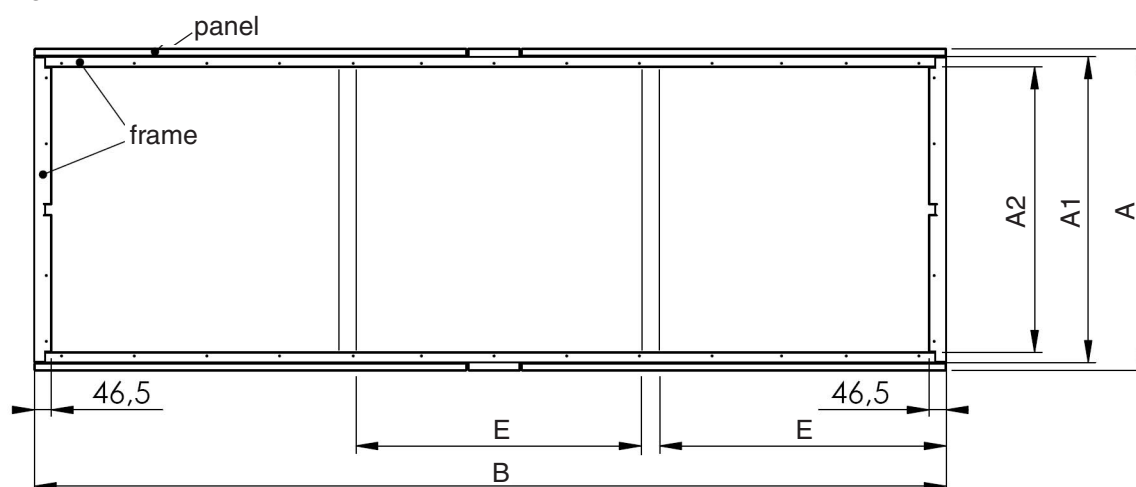
### 12.3.3 Duct

The duct will be set on top of the unit and be screwed with the unit.



Cabinet size		1	2	3	4	5	7
A	mm	884	884	884	884	884	974
A1	mm	840	840	840	840	840	930
A2	mm	784	784	784	784	784	874
B	mm	950	1400	1750	2200	2550	3110
E	mm	-	-	-	-	-	939

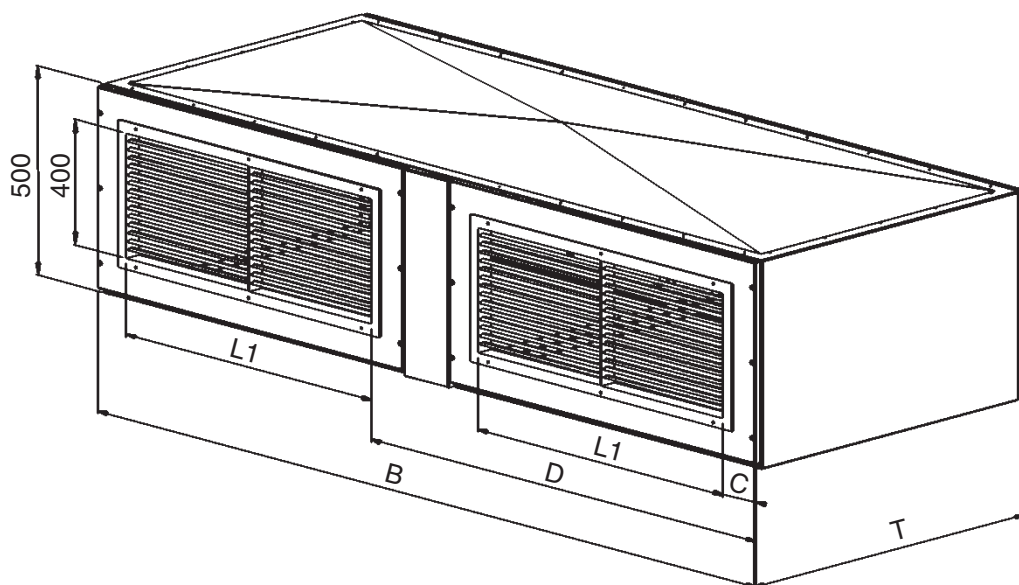
Top view:



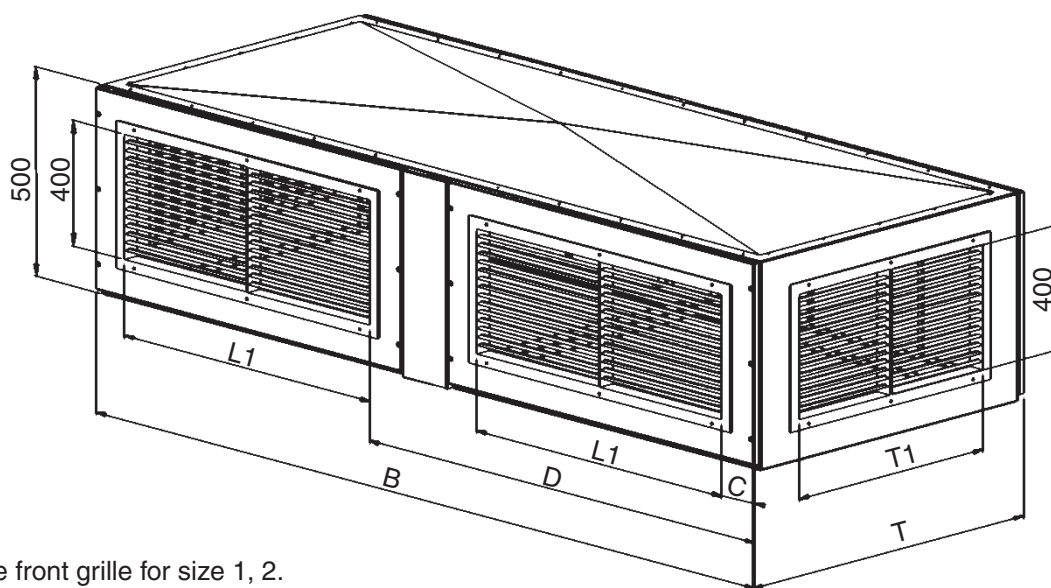
### 12.3.4 Discharge plenum

The discharge plenum is available in two different versions for all units.  
The discharge plenum will be set on top of the unit and be screwed with the unit.

#### Discharge plenum with front grilles



#### Discharge plenum with front and side grilles

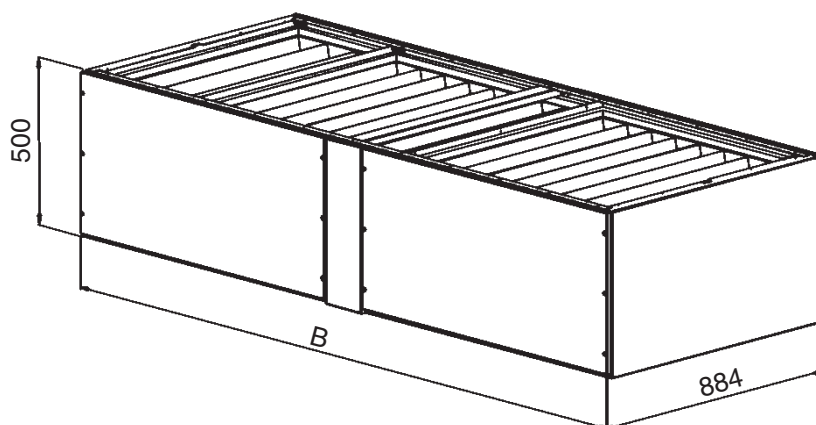


Only one front grille for size 1, 2.

Cabinet size		1	2	3	4	5	7
B	mm	950	1400	1750	2200	2550	3110
C	mm	75	100	45	112,5	100	140
D	mm	-	-	905	1287,5	1450	1770
L1	mm	800	1200	2 x 800	2 x 800	2 x 1000	2 x 1200
T	mm	884	884	884	884	884	974
T1	mm	600	600	600	600	600	800

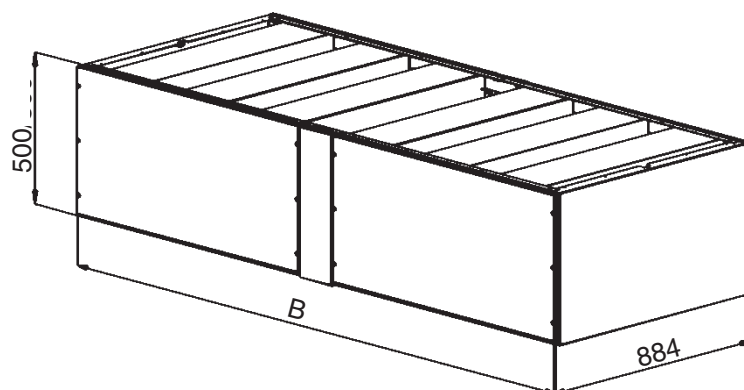
### 12.3.5 Bag filter top

The bag filter is available for all downflow units. The bag filter serves for the pre- filtration of the air which is sucked in and can be obtained in the qualities F7 and F9 (according to EN779). The bag filter top will be set on top of the unit and be screwed with the unit.



### 12.3.6 Sound insulation plenum

The sound insulation plenum is available for all units. The plenum will be set on top of the unit and be screwed with the unit.



B = unit width

### 12.3.7 Adapter plate with damper or flexible connection

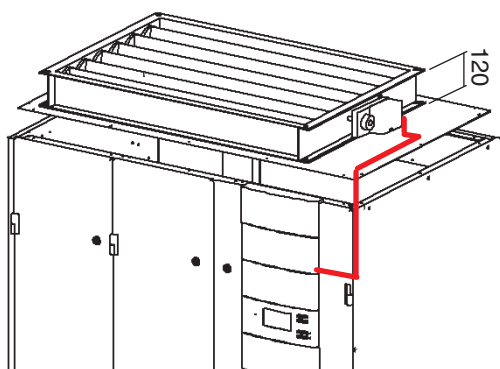
#### - Connection on the unit

The adapter plate serves to attach a damper or a flexible connection on top of the unit or a duct. First install the actuator onto the louver shaft on the right side looking at the unit front. Then fix the louver with the actuator on the adapter plate. Now mount the adapter plate with pre-mounted louver on the unit top by means of a screw connection.

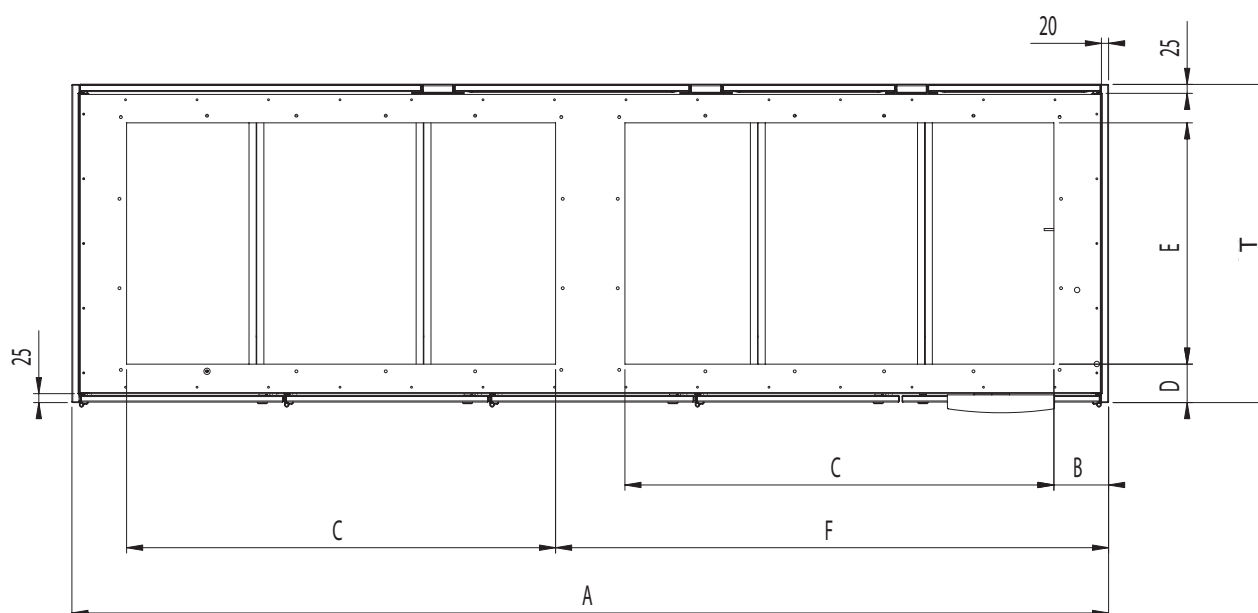
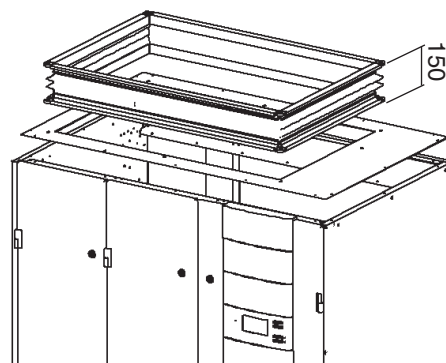
The damper actuator, which is controlled via a 24 V signal by the controller, has to be electrically connected. For this the cable, which is already connected at the motor, must be routed through an opening in the adapter plate into the unit and then be connected at the controller in the electric box according to the electric diagram.

In **downflow** units route the cable through the side panel.

Adapter plate with damper



Adapter plate with flexible connection



Cabinet size		1	2	3	4	5	7
A	mm	950	1400	1750	2200	2550	3110
B	mm	190	287	237	237	275	187
C	mm	650	1000	1400	1800	2000	1200/1300
D	mm	147	107	107	107	107	198
E	mm	650	650	675	675	675	675
F	mm	-	-	-	-	-	1797
T	mm	890	890	890	890	890	980

\*Version with flexible duct connection

If the air side has to be continued by a duct, the installation of a flexible connection is necessary. Take into account the installation of pressure compensations in the flexible connection.

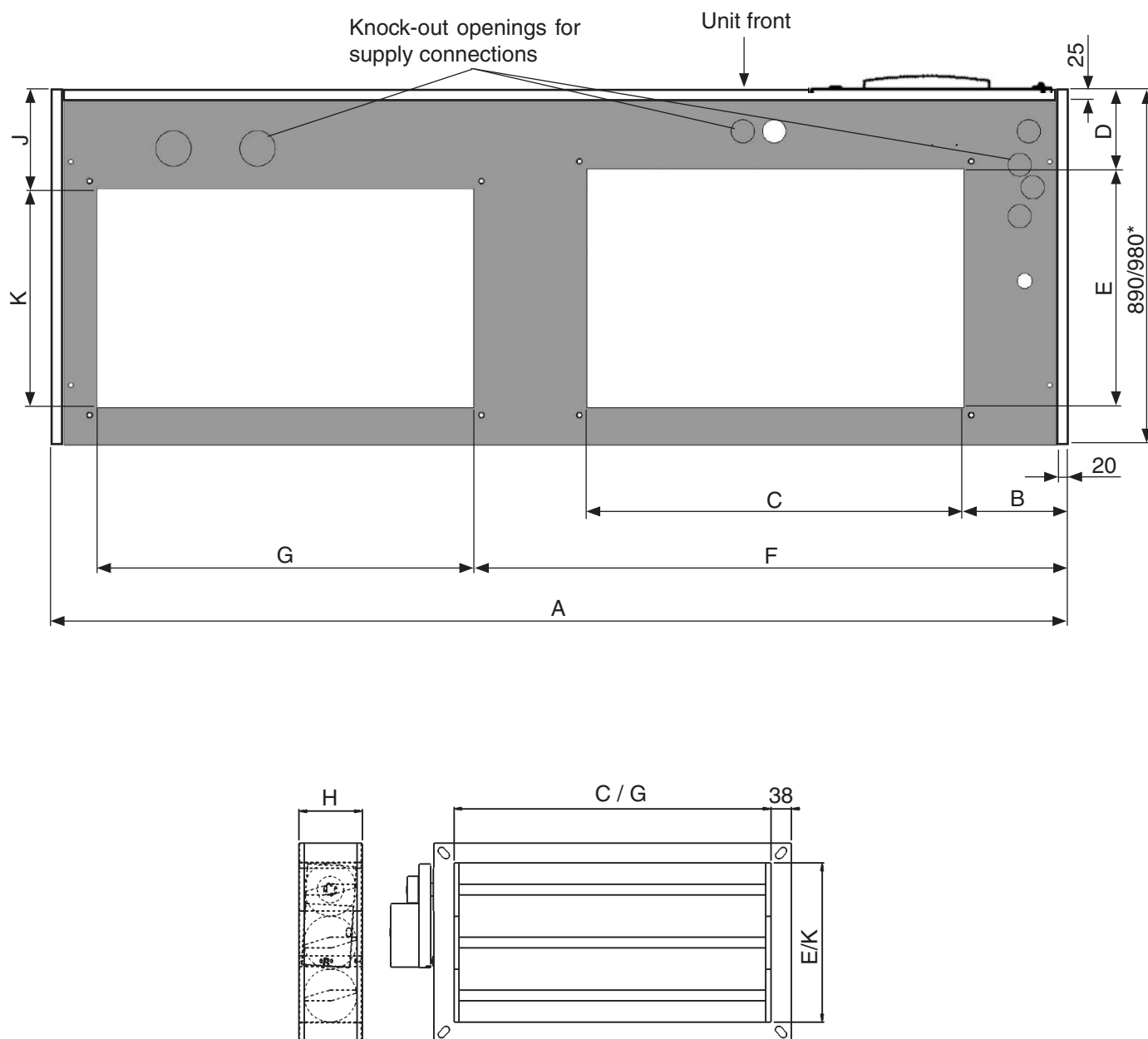
## Adapter plate with damper or flexible connection

### - Connection under the unit

The adapter plate serves to attach a damper or a flexible connection under the unit. First install the actuator onto the louver shaft on the right side (at the front for Cyberir 3 CW, construction size 1 and 2) looking at the unit front. Then fix the louver with the actuator under the adapter plate. Now mount the adapter plate with pre-mounted louver on the floor stand frame by means of bolts. Please take care that the adapter plate does not pass over the frame to avoid canting of the floor stand within the raised floor.

The damper actuator, which is controlled via a 24 V signal by the controller, has to be electrically connected. For this the cable, which is already connected at the motor, must be routed through an opening in the adapter plate into the unit and then be connected at the controller in the electric box according to the electric diagram.

Bottom view



If the air side has to be continued by a duct, the installation of a flexible connection is necessary. Take into account the installation of pressure compensations in the flexible connection.



**ASD...CW**

Cabinet size		1	2	3	4	5	7
A	mm	950	1400	1750	2200	2550	3110
B	mm	92	145	247	282	257	237
C	mm	675	1005	1400	750	950	1200
D	mm	210	260	258	210	195	185
E	mm	600	550	550	600	600	675
F	mm	-	-	-	1342	1492	1805
G	mm	-	-	-	750	950	1200
H	mm	175	175	175	120	120	120
J	mm	-	-	-	260	245	350
K	mm	-	-	-	550	550	510

Flexible connection height for all units: 150 mm

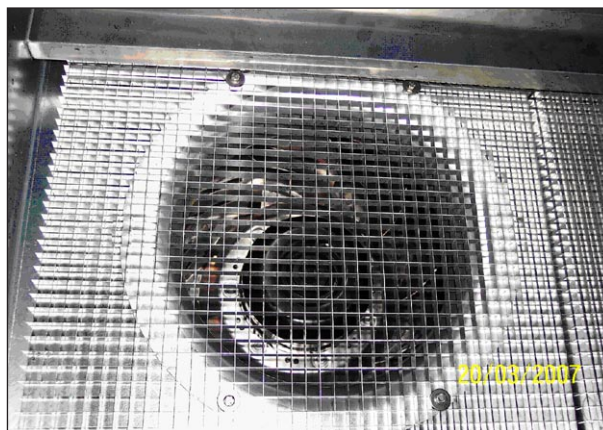
**ASD...CW2**

Cabinet size		1	2	3	4	5	7
A	mm	950	1400	1750	2200	2550	3110
B	mm	174	250	247	220	257	228
C	mm	600	1000	1400	750	950	1200
D	mm	210	300	258	210	195	185
E	mm	550	510	550	600	600	675
F	mm	-	-	-	1342	1492	1805
G	mm	-	-	-	750	950	1200
H	mm	120	120	120	120	120	120
J	mm	-	-	-	260	245	350
K	mm	-	-	-	550	550	510

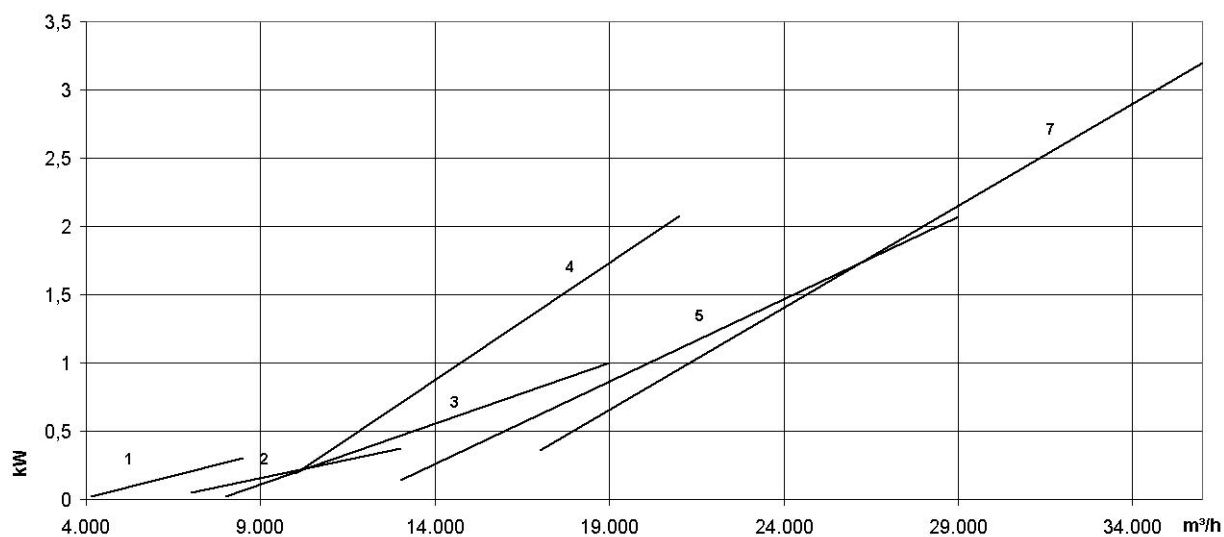
Flexible connection height for all units: 150 mm

## Airflow straightener (for Downflow units only)

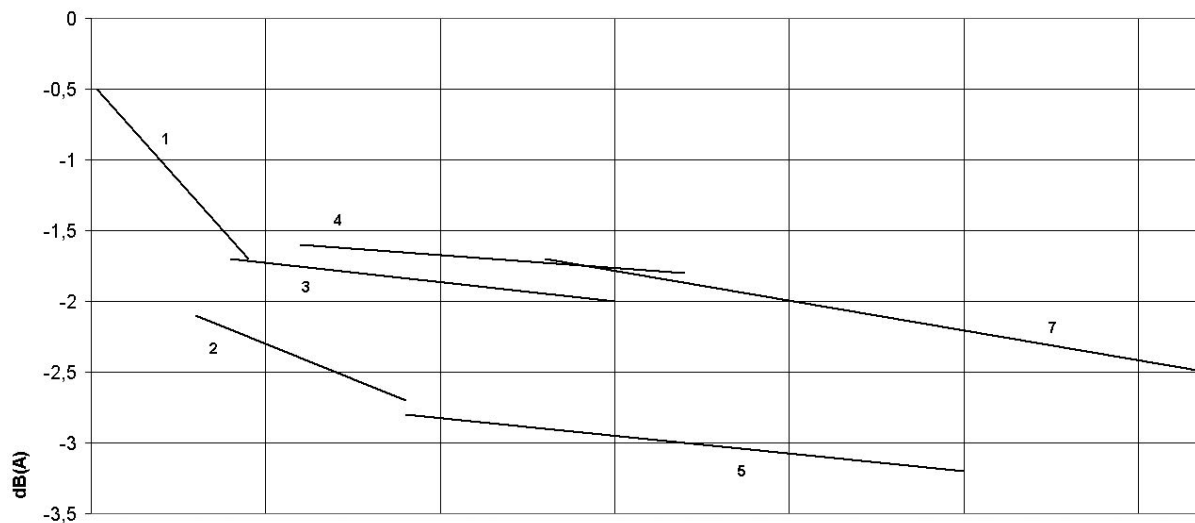
With the application of an airflow straightener grid, which is mounted onto the fan injection nozzle, the sound emission is reduced. The electrical fan power consumption is increased. In the diagrams below the absolute power increase and the sound reduction is displayed in dependence of the air volume flow for the construction sizes 1-7.



### Increase of electrical power consumption by airflow straightener 15x15x15 mm



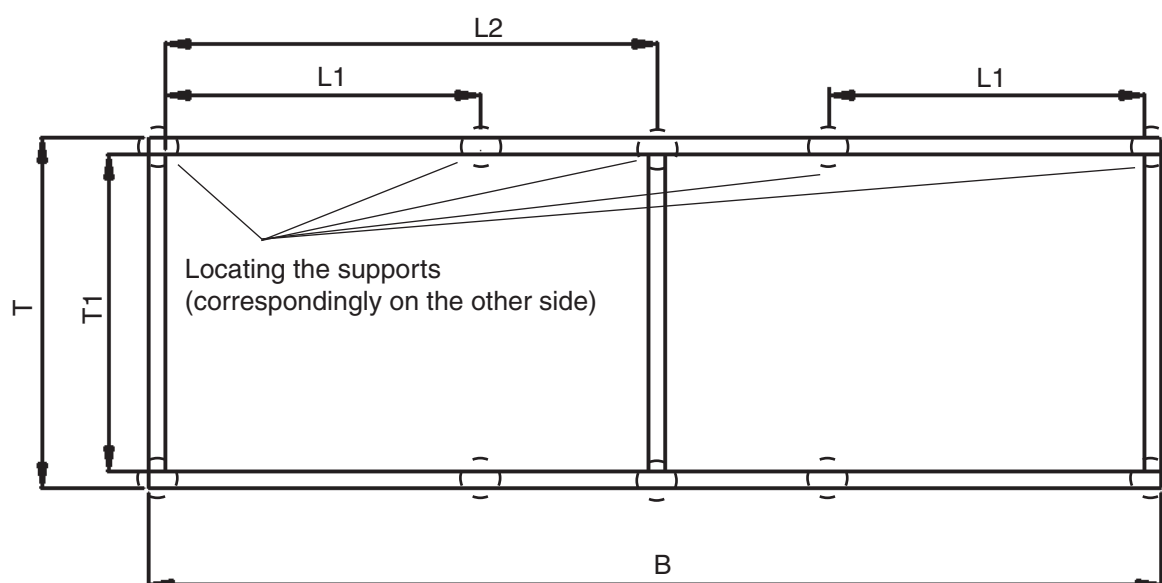
### Reduction of sound pressure level by airflow straightener 15x15x15 mm



The numbers 1-5 and 7 stand for the construction sizes 1-5 and 7.

## 12.4 Raised floor stand

The floor stand is used to adjust the height of the A/C unit to the existing raised floor and consists of an encircling rectangular profile of galvanized steel with adjustable screw sockets. Anti vibration compound is recommended between concrete floor and base plate.



Cabinet size		1	2	3	4	5	7
B	mm	910	1360	1710	2160	2510	3070
L1	mm	-	-	815	-	598	738
L2	mm	-	-	-	1040*	1215	1495
T	mm	865	865	865	865	865	955
T1	mm	785	785	785	785	785	875
Supports	n°	4		6		10	
Rectangular profiles 70 x 40	n°	4		4	5	5	
Mafund strips	n°	4		6		10	
Screws M8 x 30	n°	8		12	14	22	

Dimensions from inner side of the lateral profile to the middle of the support

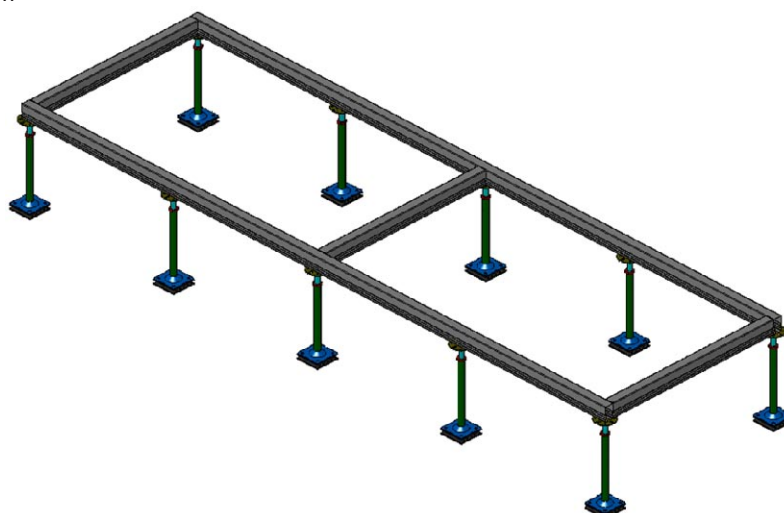
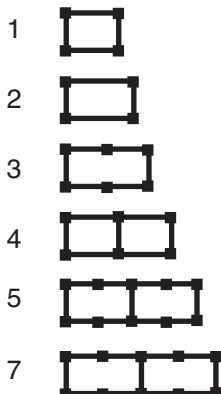
L1 - Position of the support without cross beam

L2 - Position of the support with cross beam

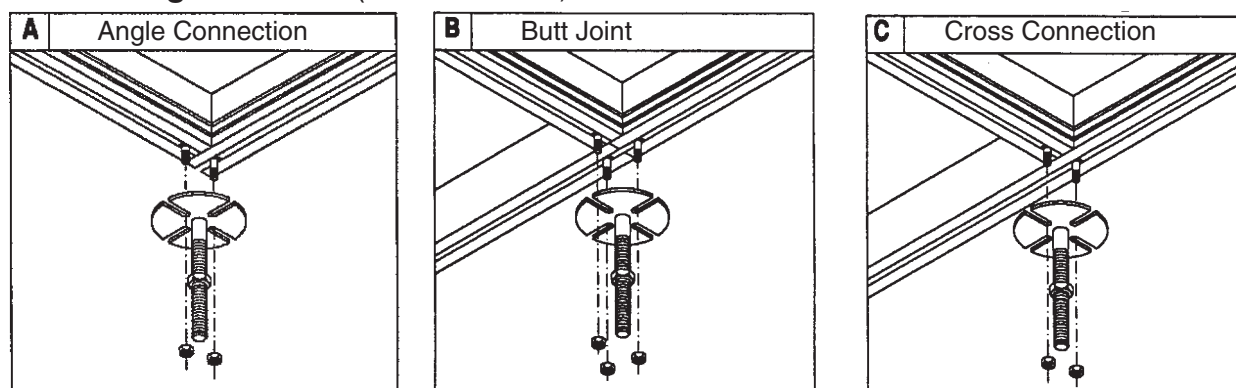
\*CW2: 1095

e.g. for size 5 and 7:

Cabinet size:

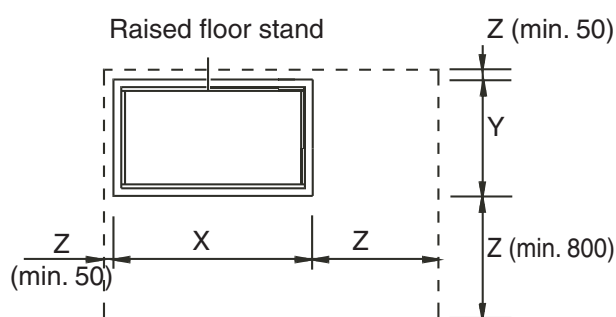


## Connecting the bars (View from below)



## Minimum distances and mounting instructions

- Please observe that the floor stand must be decoupled from the surrounding floor plates by damping insertions and that mafund plates are laid under the floor supports.
- The raised floor cutting (notch) should at least be 15° and must not have any contact to the raised floor stand, which could result in bone-conduction.
- If the floor stand is placed near a wall, a minimum distance of 50 mm should be respected. The gap between wall and floor stand should be closed by tin stripes.
- The dimensions of the openings in the raised floor (X and Y) are 10 mm longer than the raised floor stand. The joint must be closed by customers with a continuous seal.
- A concrete foundation is recommended in the area of the raised floor supports.

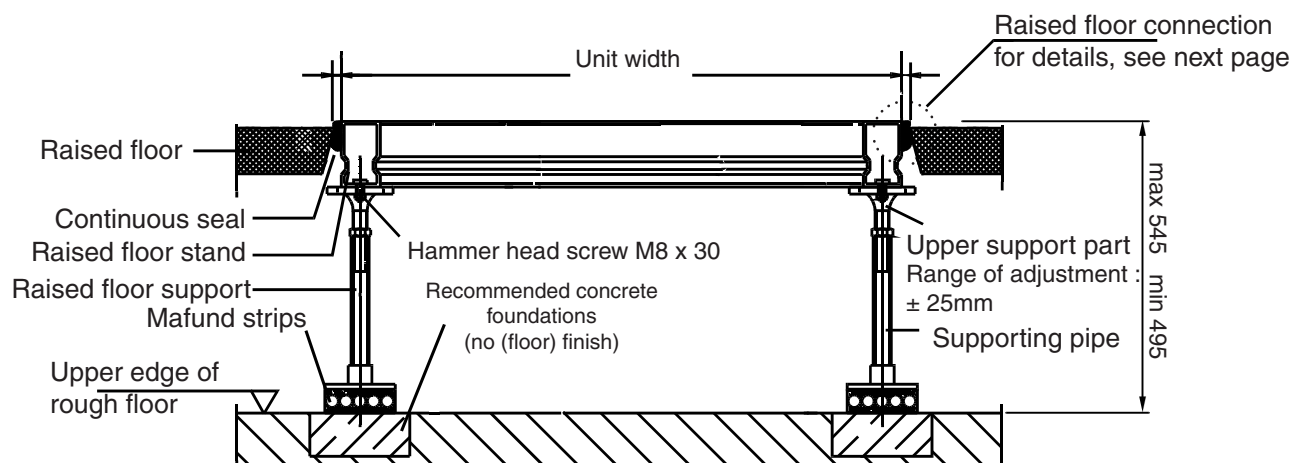


X/Y = Opening in raised floor

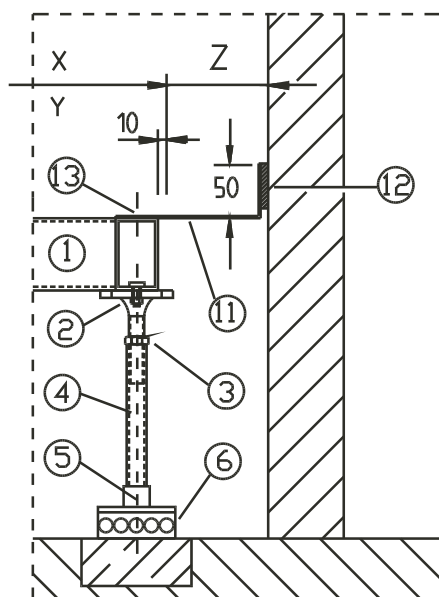
Z = Limit of distance

- The raised floor supports have to be installed on vibration dampening material (do not screw down the supports!).
- Prior to installation of the A/C unit, the raised floor must be installed 7 mm higher than the raised floor plates, as the mafund plates are compressed by the weight of the A/C unit.

## General design of the raised floor stand

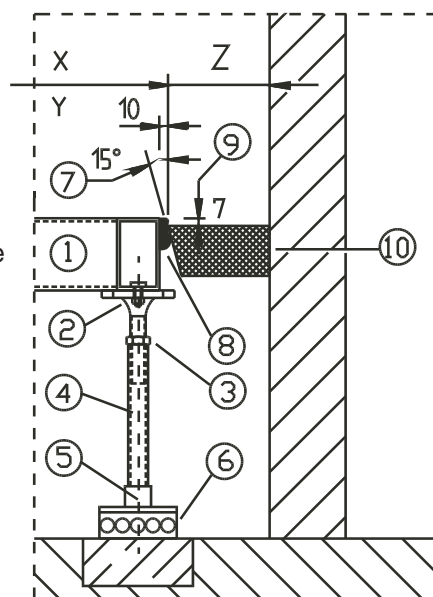


## Detail of raised floor connection



Sealing detail  
when distance  $Z < 100$  mm

- 1 Raised floor stand
- 2 Adjustable support plate
- 3 Adjusting nut
- 4 Support pipe
- 5 Support base
- 6 Mafund strips
- 7 Raised floor cut out angle
- 8 Continuous seal profile
- 9 Before unit installation
- 10 Raised floor plate
- 11 Angled bracket
- 12 Permanently elastic seal
- 13 Fixing



Sealing detail  
when distance  $Z \geq 100$  mm

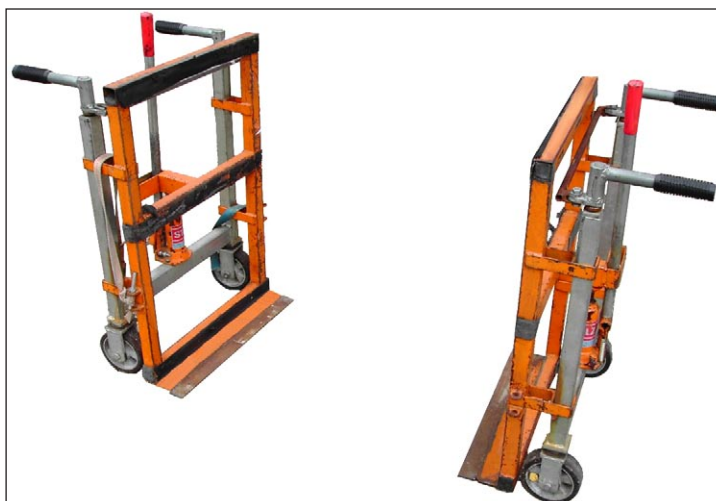
## Other mounting options (e.g. louvers)

If louvers shall be installed beneath the unit, these must be first mounted onto the adapter plate. If there are two or three louvers, the louver shafts are connected by a coupling piece. The louver actuator, which has to be installed on the shaft, will later be on the right unit side in the proximity of the electric cabinet.

## Positioning of the A/C unit on the floor stand

When positioning the A/C unit on the floor stand, it must be brought precisely into the correct position above the floor stand from the front (under no circumstances diagonally). Hereby use mounting aids to bring in the unit and secure these by fixing belts. We recommend further to lay in advance at least two securing instruments (e. g. square steel bars) on the stand to avoid a slip-off.

When the unit is in the right position the securing aids can be taken away and the unit can be set down. Now the mounting aids can be pulled away under the unit.



Mounting aid